DOCUMENT RESUME

ED 372 766 IR 055 126

TITLE	Reports of the AAU Task Forces on Acquisition and Distribution of Foreign Language and Area Studies Materials; A National Strategy for Managing Scientific and Technological Information; Intellectual Property Rights in an Electronic Environment.
INSTITUTION	Association of American Universities, Washington, D.C.; Association of Research Libraries, Washington, D.C.
REPORT NO	ISBN-0-918006-24-4
PUB DATE	May 94
NOTE	137p.
AVAILABLE FROM	ARL, 21 Dupont Circle, Suite 800, Washington, DC 20036. (Also available through gopher at arl.cni.org under the Scholarly Communications menu.)
PUB TYPE	Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Reports - Research/Technical (143)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Academic Libraries; Access to Information; Area Studies; College Administration; Computer Networks; Futures (of Society); Higher Education; Information Management; *Information Networks; Intellectual Property; Library Collection Development; National Programs; Policy Formation; *Research Libraries; Scientific and Technical Information; Second Languages
IDENTIFIERS	Association of American Universities; National Information Infrastructure; *Scholarly Communication; Task Force Approach

ABSTRACT

The Association of American Universities (AAU) Research Libraries Project was designed to involve universities in the process of shaping the new electronic environment faced by research libraries. The project has engaged university expertise to develop recommendations for action at the national and institutional levels to assure that the perspectives of research universities can play a defining role in the evolution of national information network policies and practices affecting university education, research, and scholarship. The work of the project was carried out through three task forces whose results are reported here: (1) Acquisition and Distribution of Foreign Language and Area Studies Material; (2) A National Strategy for Managing Scientific and Technological Information; and (3) Intellectual Property Rights in an Electronic Environment. Each report contains an overview of the issue; recommendations of the task force; and proposals for policy implementations. (JLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 372 766

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it

☐ Minor changes have been made to improve reproduction quality

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

---

Association of American Universities Research Libraries Project

in collaboration with
the Association of Research Libraries

Reports of the AAU Task Forces

on

Acquisition and Distribution of Foreign Language and Area Studies Materials

A National Strategy for Managing Scientific and Technological Information

Intellectual Property Rights in an Electronic Environment

IR055126

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

C.A. Mandel

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

Association of American Universities Research Libraries Project

in collaboration with
the Association of Research Libraries

Reports of the AAU Task Forces

on

Acquisition and Distribution of Foreign Language and Area Studies Materials

A National Strategy for Managing Scientific and Technological Information

Intellectual Property Rights in an Electronic Environment

Association of Research Libraries
Washington, DC
May 1994

ISBN: 0-918006-24-4

Principal coordination of these reports:

Presidents' Steering Committee, and
John C. Vaughn, Director of Federal Relations, AAU
Duane Webster, Executive Director, ARL

Foreign Language and Area Studies:
John H. D'Arms, University of Michigan
Jutta Reed-Scott, ARL

Scientific and Technological Information:
Richard West, California State University System
Jaia Barrett and Diane Harvey, ARL; Paul Evan Peters, CNI

Intellectual Property:
Peter E. Nathan, University of Iowa
Ann Okerson, ARL

Coordination of final compilation:
Ann Okerson, ARL

Electronic Version:
Dru Mogge, ARL

© Association of Research Libraries. This work also appears on the ARL Gopher (arl.cni.org) under the Scholarly Communications menu. Please request permission for copying beyond fair use to:

ARL
21 Dupont Circle, Suite 800
Washington, DC 20036
phone: 202-296-2296
fax: 202-872-0884
e-mail: osap@cni.org

This book is printed on acid-free paper and cover stock

TABLE OF CONTENTS

Foreword

Cornelius J. Pings, President
Association of American Universities i

Reports of the Task Forces

Acquisition and Distribution of Foreign Language and Area Studies Materials *1*

- Table of Contents *3*
- Task Force Members *5*
- Charge *7*
- Report *9*
- (Recommendations) *13*
- Background Paper - Research Libraries in a Global Context *29*

A National Strategy for Managing Scientific and Technological Information *43*

- Table of Contents *45*
- Task Force Members *47*
- Charge *49*
- Report *51*
- (Recommendations) *55*

Intellectual Property Rights in an Electronic Environment *101*

- Table of Contents *103*
- Task Force Members *105*
- Charge *107*
- Report *109*
- (Recommendations) *151*

FOREWORD

In the fall of 1991, the Association of American Universities (AAU) began a series of discussions with the Association of Research Libraries (ARL) about the opportunities provided by electronic communication and computer-based information networks to address the economic pressures facing research libraries and advance university missions of teaching and research. It seemed clear that the rapidly developing electronic environment could provide university faculties and students with new options for the collection and dissemination of scholarly information, options that could both expand access to university-generated information and reduce the unit costs of that access. Over the longer term, electronic communication and computing technology could provide fundamentally new ways of collaborating in the *conduct* of research, as well as the dissemination of its results.

It also seemed clear from these AAU/ARL discussions that the electronic environment was unlikely to evolve optimally to support the missions of universities unless the universities themselves became directly involved in shaping that environment, designing options carefully and pursuing their implementation systematically.

The AAU Research Libraries Project was designed for this purpose. Initiated by the AAU member presidents and chancellors in April 1992, the project has engaged the full range of university expertise to develop recommendations for action at the national and institutional levels to assure that the perspectives of research universities can play a defining role in the evolution of national information network policies and practices affecting university education, research, and scholarship.

The work of the project has been carried out through three task forces:

1. Acquisition and Distribution of Foreign Language and Area Studies Materials

2. A National Strategy for Managing Scientific and Technological Information

3. Intellectual Property Rights in an Electronic Environment.

The task forces, comprising university administrators, librarians, and faculty members, have reported to a Project Steering Committee of AAU presidents and chancellors. The initial members of the steering committee were:

President Hanna H. Gray, University of Chicago, Chair
President Myles Brand, University of Oregon, Co-Chair
Chancellor Richard C. Atkinson, University of California, San Diego
President John Lombardi, University of Florida
President Martin Massengale, University of Nebraska
President Charles M. Vest, Massachusetts Institute of Technology

Myles Brand assumed the role of chair in July 1993, with the departure of Hanna Gray from the committee in anticipation of her leaving the Chicago presidency.

AAU has worked in close collaboration with the ARL on the project, from its initial conception through its completion. ARL has provided exceptionally strong staff support for the three task forces.

The reports of the three task forces included here were presented to the AAU membership at this year's spring meeting, and were unanimously endorsed by the membership on April 19.

The completion of this project represents a starting point for the implementation phase of what must be a continuing effort to shape the electronic environment to support university teaching and research. We owe an extraordinary debt of gratitude to the dedicated work of the members of the task forces, whose considerable commitment of time and effort in pursuit of common purposes has provided the higher education community with a comprehensive set of actions to undertake in developing this new scholarly communications frontier. The best way we can show our gratitude to task force members is to begin the work necessary to turn their recommendations into new national and institutional policies supporting scholarly communication, and AAU has begun developing the mechanisms by which the task force recommendations will be acted on.

I also want to thank The Andrew W. Mellon Foundation, whose generous support made this project possible. The Mellon Foundation has long played a leading role in assisting universities and their research libraries to develop new ways to meet the mounting challenges confronting those libraries. Indeed, in many ways the AAU Research Libraries Project builds on the work of the Foundation's study, *University Libraries and Scholarly Communication*. Published in November 1992, this thoughtful, comprehensive analysis of research libraries examined a number of ways in which the evolution of electronic networks and computing technology might generate new options for addressing library pressures.

The translation of recommendations into policies will be neither simple nor direct. Readers of these reports will note that although some recommendations are quite specific, many identify further questions to be answered, additional issues to be considered. I hope that these reports can serve as a catalyst to broad collaboration within the academic community—in this country, in North America, and internationally—on efforts to develop an electronic environment providing enhanced support for teaching and research.

Cornelius J. Pings
President
Association of American Universities

Report of the AAU Task Force

on

Acquisition and Distribution of Foreign Language and Area Studies Materials

Submitted to the AAU Presidents Steering Committee
April 4, 1994
Washington, DC

Endorsed by the AAU Presidents
April 18, 1994
Washington, DC

TABLE OF CONTENTS

Task Force Members 5

Charge 7

Preface 9

Introduction 11

Summary of Task Force Recommendations 13

Historical Perspectives on Foreign Acquisitions 14

Program for the Distributed Collections of Foreign Acquisitions 16

Impact on Faculty 19

Implementation Strategy 20

Demonstration Project Proposal: Latin American Studies Resources 21

Demonstration Project Proposal: Japanese Language Scientific and Technical Serials 23

Demonstration Project Proposal: German Resources 25

Evaluation of the Program 27

Background Paper 29

AAU Task Force on Acquisition and Distribution of Foreign Language and Area Studies Materials

Task Force Members

John H. D'Arms, Chair
Vice Provost for Academic Affairs and Dean of the Graduate School, University of Michigan

Dorothy Gregor
University Librarian, University of California - Berkeley

Burkart Holzner
Director, University Center for International Studies, University of Pittsburgh

Deborah Jakubs
Head, International and Area Studies Department, Duke University Library

Edward Keenan
Professor of History, Harvard University

Gilbert W. Merkx
Director, Latin American Institute, University of New Mexico

Brian Merilees
Professor of French, University of Toronto

Paul H. Mosher
Vice Provost and Director of Libraries, University of Pennsylvania

Jutta Reed-Scott (staff)
Senior Program Officer for Preservation and Collections Services, Association of Research Libraries

George Shipman
Director of Libraries, University of Oregon

Ronald P. Toby
Professor of History, University of Illinois, Urbana-Champaign

David Wiley
Director, African Studies Center, Michigan State University

Task Force on Acquisition and Distribution of Foreign Language and Area Studies Materials

CHARGE

This task force will be made up of librarians, area studies center directors and scholars, and government relations officers. It will be asked to develop a four-part strategy for increasing acquisitions of foreign materials and expanding access to them:

- Working in conjunction with area studies groups, develop some measure of needs and priorities for foreign materials by world area.
- Establish specific national acquisition targets, based on area-specific needs and priorities and on additional information provided from current studies (see below).
- Develop models for collection and distribution of foreign materials.
- Develop a plan of action for securing the requisite funding.

Background: Many libraries are facing sharp reductions in their acquisitions of foreign materials due primarily to three developments: (1) the dollar has dropped more than 40% on world currency markets over the last three years; (2) the rising cost of all materials has forced libraries to reduce expenditures on foreign books and materials, and (3) political developments abroad have played havoc with collection strategies—for example, the loss of state subsidies in Eastern Europe has meant that journals formerly obtained through exchange agreements must now be purchased at Western European prices.

The combination of rising serial prices and the increasing need to maintain collections that reflect the rapid and profound political, social, and economic changes throughout the world calls for new cooperative ventures to strengthen our foreign language and area studies centers and expand the access of scholars to them.

ARL is conducting a study funded by the Mellon Foundation to assess what appears to be an inverse relationship between decline in U.S. acquisitions of foreign materials and the explosion in global knowledge. This study should help provide a rational basis for setting acquisition targets as part of a comprehensive national collection and dissemination plan covering the 10 world areas.

Title VI of the Higher Education Act provides a locus for federal funding. Title VI's foreign periodical acquisitions program was first funded in FY 1992 at $500,000. The program is likely to have its authorization ceiling substantially increased and its scope expanded from foreign periodicals to foreign research materials during this year's HEA reauthorization.

Development of procedures for the collection and distribution of foreign periodicals could provide models for more general resource sharing plans.

TASK FORCE ON ACQUISITION AND DISTRIBUTION OF FOREIGN LANGUAGE AND AREA STUDIES MATERIALS

PREFACE

This report is the culmination of the year-long examination of the trends in foreign acquisitions for major North American research institutions by the AAU Task Force on Acquisition and Distribution of Foreign Language and Area Studies Materials. The Task Force is an initiative of the Association of American Universities (AAU) in collaboration with the Association of Research Libraries (ARL). As one component of the tripartite AAU Research Libraries Project, the Task Force was charged with developing and examining options for improving access to and delivery of foreign language materials.

Realizing the problems faced by universities in trying to reconcile increased budgetary constraints against increased demand for foreign research materials, the Task Force set out to develop a working model for cooperative collection development in North America. It is the Task Force's opinion that the key to improving access to and delivery of international research resources is the creation of a network-based, distributed program for coordinated development of foreign acquisitions for U.S. and Canadian research libraries.

The Task Force's proposal outlines the development of three area based projects to demonstrate the success of such a plan. In order to achieve the ultimate goal of a distributed North American collection, the demonstration projects will be launched to show how different world areas can be incorporated into an overall program. They will also aggressively test the barriers to distributed access and evaluate the impact of the plan on scholars communication and research. The three projects will focus upon Latin American Acquisitions, German language acquisitions, and Japanese language scientific and technical resources.

INTRODUCTION

Educational institutions and industries are directly affected by the accelerating push towards a globalized information market. This is especially true in the United States and Canada, where the scholarly community is linked by electronic networks, characterized by endemic social and technological change, and subject to rapidly shifting economic and political pressures. Readily accessible information resources are therefore critical for stable and fair policy formation, productive research, effective education, and national information infrastructure creation.

Research libraries play a critical role in supporting this international agenda for change. Despite their vital importance in disseminating information in an increasingly globalized information market, demand from libraries for foreign materials has steadily eroded in the last decade. Each year research libraries in the aggregate are able to purchase a smaller portion of published foreign resources than the year before.

With the increasing emphasis on international cooperation, research universities are committed to fostering "internationalization" in both their curricula and research priorities. At the same time however, American and Canadian research libraries are actually reducing acquisitions of foreign publications because of increased budgetary constraints.

The Task Force was not only concerned with this gap between demand and availability of foreign language materials in North American research libraries, but with its impact on teaching, research and scholarship. The importance of foreign imprints to area studies and language programs is self-evident, but it is also essential that scholars in the social sciences, humanities, and physical and biological sciences have access to current research findings, wherever they exist.

Therefore, the Task Force's work built upon the efforts of the related, but separate, ARL Foreign Acquisitions Project. This earlier initiative measured the extent to which North American research libraries have reduced foreign publications acquisitions for research and teaching. The Task Force's primary focus was on developing a distributed service model for the acquisition and distribution of foreign materials. Related efforts looked at strategies for educating university administrators about the impact of this new model, and at fashioning strategies and funding mechanisms for implementing such a program. Measures of the needs and priorities for foreign materials, and the development of specific national acquisitions targets, were referred to the continuing work of the ARL Foreign Acquisitions Project.

After more than a year of concentrated effort, involving meetings of the full Task Force and preparation of issue papers by smaller groups, the Task Force has realized that a fundamental transformation is needed in the way research libraries operate. Working within the constraints of three themes: opportunity, change, and discontinuity, the Task Force concluded that:

- Current information technology provides the opportunity to move toward a fully linked digitized network of research library collections;

- Fundamental changes are needed to facilitate such a move toward such electronic resource sharing. Foremost is the reallocation of acquisitions funds away from those "associated with building a self-sufficient collection" and toward "those associated with cooperative collection development and sharing" [1]; and

- Library services should be restructured to rely more heavily on remote access and digitized materials rather than on maintaining print-based materials.

These recommendations offered by the Task Force are directed towards maintaining foreign acquisitions at a level adequate to North American needs. The Task Force recommends the development of a network-based, distributed program for coordinated collection development of foreign language materials among U.S. and Canadian research libraries.

Resource sharing has long been important for research libraries, and the Task Force strongly believes that cooperative collection development initiatives can only be successful if effective document delivery is assured. One of the basic themes underlying the Task Force's analysis is the vital importance of the electronic infrastructure in improving access to and delivery of information resources. The electronic telecommunications explosion and high-powered desktop computers have the potential to dramatically transform the ways in which scholars gain access to research materials worldwide. This electronic superhighway will make speedy access to vast amounts of information possible.

Recognizing the many complexities of foreign acquisitions, the Task Force has come to appreciate the difficulty, even the impossibility, of solving all of the problems at once. But the Task Force also believes that this is certainly the time to act, and thus makes the following recommendations. To test the viability of implementing a distributed, networked, cooperative program for foreign acquisitions among major North American universities and libraries, the Task Force recommends conducting three diverse demonstration projects. These will target Latin American acquisitions, German language acquisitions, and Japanese language scientific and technical resources.

Summary of Task Force Recommendations

The Task Force concluded that a trial collaborative program would provide the most effective strategy for improving access to global materials. At the same time, this program would also provide the needed information infrastructure that supports the transition to electronic resource sharing.

RECOMMENDATION I

The major North American research universities and libraries should organize a distributed program for access to foreign acquisitions. This program should include the Library of Congress and foreign national and research libraries working together to organize a cooperative program that shares the responsibility for acquiring, organizing, and facilitating access to foreign acquisitions.

The Task Force believes that such a program is the most effective way to provide access to foreign materials in research libraries. It builds on the current architecture of collaborative interdependence among research libraries. It also calls for the long-term development of a systematic program for coordinated collection development of foreign materials among U.S. and Canadian research libraries. Under this plan, participating institutions will share responsibility for collecting foreign imprint publications, and for distributing the "distributed North American collection of foreign materials." Implicit in the design of the program is the need to develop organizational structures and selection mechanisms to support the building of foreign language collections on a multi-institutional, cooperative basis. The Task Force recommends that the program be developed in an evolutionary manner, taking advantage of cooperative programs that already exist.

RECOMMENDATION II

The major North American research universities and libraries should implement the program through three demonstration projects.

The Task Force recommends that three demonstration projects be launched to show how different world areas can be incorporated into one successful program. The demonstration projects will aggressively test the barriers to distributed access and evaluate their impact on faculty. The initial projects will target Latin American acquisitions, German language acquisitions, and Japanese language scientific and technical resources.

RECOMMENDATION III

The Task Force identified several strategic objectives that must be addressed:

- **Universities should plan and fund the electronic infrastructure necessary to support the new avenues of access and delivery crucial to the success of a distributed North American collection.**

- **University leaders and their research librarians should articulate incentives to scholars and faculty for moving away from local and toward remote access, so that an individual institution's library may develop in-depth collections in a few selected areas, but provide remote access to many more in-depth collections.**

- **Planning and development of the distributed program should focus special attention on meeting the needs of scholars and researchers and thereby build support among faculty; without such faculty support, the ultimate objectives will be difficult to achieve.**
- **University leaders and their research libraries should recognize the need for addressing issues related to managing intellectual property rights, recognizing that copyright laws differ substantially throughout the world.**

HISTORICAL PERSPECTIVES ON FOREIGN ACQUISITIONS

Due primarily to increasing budgetary constraints, financial support for acquiring global materials has steadily eroded in the last decade. Evidence of the problems in foreign acquisitions is provided by the Association of Research Libraries' Foreign Acquisitions Project, funded by The Andrew W. Mellon Foundation. Reports from the studies conducted by U.S. and Canadian collection specialists underscore that ARL libraries are not acquiring and making available as great a proportion of foreign publications as required; due largely to the declining purchasing power of the dollar in the global market, inflation, and the growing numbers of foreign publications available or known to be available.

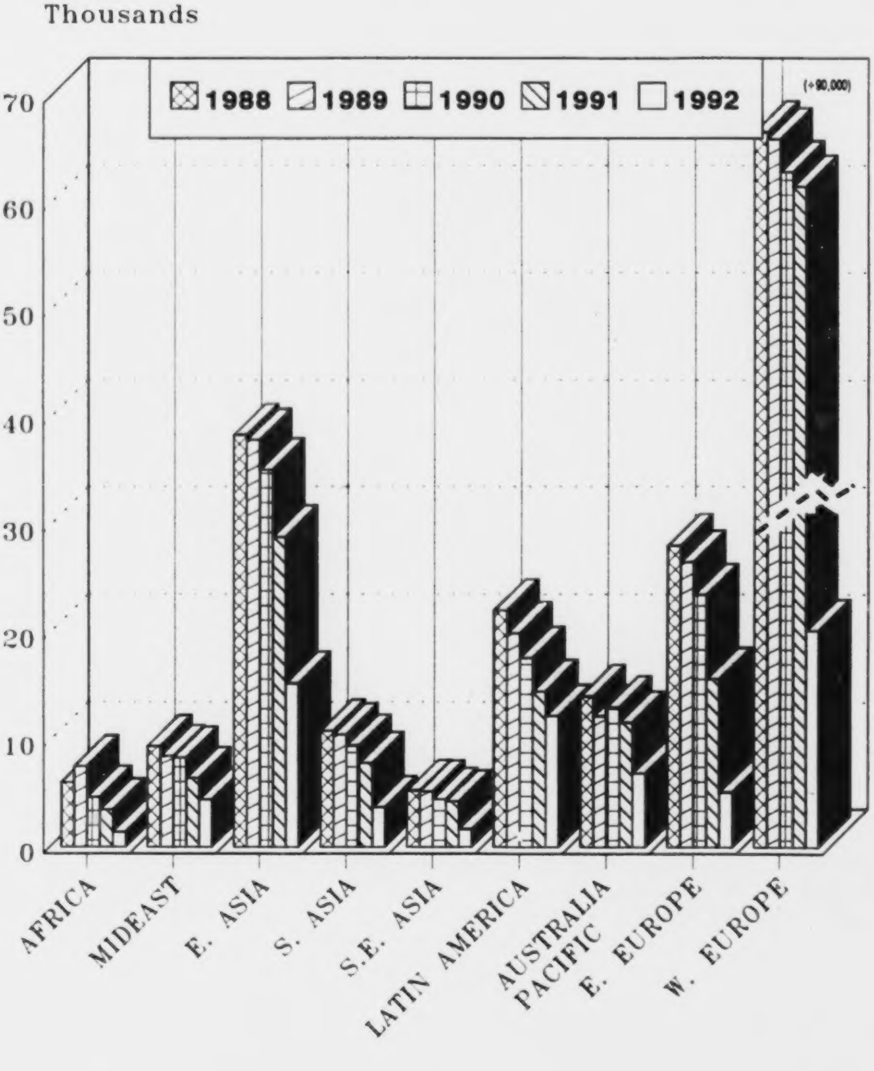
The aggregate decline in the number of titles acquired by libraries is highlighted by the chart that follows. It is based on cataloging data for libraries that contribute records to the Online Computer Library Center (OCLC) database. The chart displays the number of unique titles for the period 1988 through 1992 based on the year of imprint and the country of publication. The 1992 data is incomplete because the items acquired by libraries may not yet be cataloged.

Compounding the foreign access problem is the inability of the Library of Congress to maintain its past level of foreign acquisitions, as seen in the proportion of foreign publications made available through the Library's far-reaching programs. The extensive study of the operations and economics of research libraries, *University Libraries and Scholarly Communication*, brings these problems into sharp focus. Prepared for The Andrew W. Mellon Foundation, this study shows that the rate of increase in books acquired by university research libraries virtually halted in the 1970s and 1980s, while the number of titles published internationally continued to increase [2].

International publishing has increased much more rapidly than acquisitions budgets during the past four decades. Even a cursory examination of the data on international publishing reveals substantial growth in the number of new titles. From 1980 to 1990, worldwide book production increased by 45 percent, and European book publishing has grown at a rate substantially ahead of U.S. publishing. So great is the disparity that the six most productive European countries (Switzerland, Italy, France, Germany, the U.K. and the Netherlands), which in 1971 produced about 1.5 times as many titles as American publishers, now produce more than twice the number of titles of their American counterparts. [3]

Changes in research patterns have also created new demands for foreign language materials. The shift to problem-driven research has been accompanied by greater diversity of needs and therefore, increased demand. The growing importance of nontraditional areas of investigation, such as global environmental studies, sustainable development, ethnicity, and nationalism, require a broader array of materials. This explosion in the quantity of desirable material, rapid escalation of unit prices for these items, and increased demand jeopardize the traditional research library mission. It is the Task Force's opinion that these problems can no longer be addressed through intra-institutional solutions.

As noted above, the rapid emergence of electronic information technologies promises to replace traditional venues of collection access with digitized, remote access, making materials available to scholars and students when needed. But fundamental to the success of this new paradigm is the existance of at least one fully accessible, archival copy (preferably digitized) of all the publications necessary for research and teaching; and the existance of a means (a database, a network and a delivery system) for identifying and accessing those publications.


TRENDS IN FOREIGN ACQUISITIONS

BASED ON OCLC DATABASE
1992 DATA LOW DUE TO CATALOGING BACKLOGS

A PROGRAM FOR THE DISTRIBUTED COLLECTION OF FOREIGN ACQUISITIONS

The key to improving access to and delivery of international research resources is the creation of ***a network-based, distributed program for coordinated development of foreign acquisitions for U.S. and Canadian research libraries.***

The recommended program has two complimentary components: 1) restoration and maintenance of a strong collection in support of education, research, and public policy; and 2) creation of the organizational and electronic infrastructure to support reliable electronic access and delivery of information resources in foreign language, area, and international studies. A prerequisite for the development of such a program is a strong and distributed research collection of foreign materials created through institutional cooperation.

ORGANIZING PRINCIPLES

The "organizing principles" or prerequisites for a successful program are:

1. Building a broad-based commitment to maintain foreign acquisitions adequate to meet national needs;

2. Implementing the plan through a series of smaller-scale demonstration projects designed to evolve within the framework of the overall program;

3. Improving access to and delivery of information to ensure timely and effective use;

4. Developing the campus networks and the electronic infrastructure to facilitate electronic document delivery;

5. Utilizing existing programs, organizations and consortia that support the plan's goals and recognizing the inherent strengths of existing programs, such as the National Resource Centers and their libraries or other foundation-supported programs;

6. Building an area-based acquisition program that incorporates ongoing assessments of the needs of diverse users;

7. Developing a realistic financial plan for providing ongoing support from multiple sources;

8. Decognizing the present and potential roles played by the Library of Congress, National Library of Medicine, National Agricultural Library, National Library of Canada, and other national institutions;

9. Strengthening collaborative programs with foreign libraries, archives, and information services; and

10. Incorporating mechanisms for collective consultation, program evaluation, and periodic revision of acquisition strategies.

COMPONENTS OF THE PROGRAM

The sections below outline the general aspects of a network-based distributed system for cooperative development of foreign imprint collections. The mission statement charts broad directions for the program and will serve as the framework for specific demonstration projects. Implicit in the plan is the development of a series of area-based programs tailored to the needs and special characteristics of each area. Because the problems and possibilities differ for each, these world areas will have their own structures and set of goals and priorities.

1. Participation

The Task Force recommends that each institution's participation in the plan be based on that institution's willingness to commit resources in support of the program. Also important, is its ability to contribute to and participate actively in a network-based subject/area plan, as evidenced by adequate existing collections, staff, and financial resources.

Both the Library of Congress and the Center for Research Libraries (CRL) have evidenced their willingness to participate. CRL, because of its established programs for foreign acquisitions and maintenance of substantial collections of foreign research materials, will be a full, cooperative participant in the plan. Their collection will serve to supplement the collections of major North American research libraries.

A principal element of the plan will be CRL's thirty-years of experience in administering both foreign area studies acquisitions and preservation projects. Their established mechanism for cooperative collection development of foreign materials not highly demanded, such as dissertations, archives, and foreign official gazettes will serve as a blueprint for the plan.

The National Library of Medicine, the National Agricultural Library, and the National Library of Canada will also play a part in the plan. Over time, the development of foreign language and area collections, as well as access services, will become an international effort involving major national and research libraries overseas. With the rapid advances in telecommunications, greater cooperation on a global scale will be possible.

Institutions participating in the plan will be encouraged to examine the possibilities of cooperative ventures with other foreign libraries. The national libraries listed above could be particularly helpful in forging collaborative programs with foreign national libraries.

2. Components of Responsibility

The plan proposes that participating institutions agree to identify suitable staff and resources to manage the network-based acquisition and access services. These would include the ability to use and navigate the Internet and other networks, develop planning and writing skills to effectively communicate with diverse constituencies, manage print and network-based bulletin boards and newsletters, and organize meetings on a national level on the network and through professional organizations

Institutions which commit to participation in the plan will agree to engage in it for at least five years. Participating institutions will agree (individually or as consortia) to maintain and manage research collections, to provide bibliographic access on a priority basis to the national bibliographic networks, and to provide access to those collections so developed on a continuing basis via interlibrary loan, in-person on-site access, and via other document transmission methods. A high priority will be placed on digitization of materials acquired under the terms of the plan.

3. Governance and Administration

The Task Force recognizes that there will be a need for a continuing AAU/ARL presence in the program to facilitate advancement and fundraising efforts. The Task Force recommends that the Association of Research Libraries and the Association of American Universities comprise the organizational coalition and that the Association of Research Libraries, through its Research Collections Committee provide program oversight.

By its very nature, the governance structure will involve change and be a continuing concern. As the demonstration projects move forward, working relationships among all the stakeholders will need to be carefully and thoughtfully developed. To begin, the Task Force advocates a dual approach. ARL will provide the overall coordination of the program, assist in fund raising efforts, and evaluate the program. However, specific foreign area library committees or organizations will have primary operational responsibility for area-based projects.

4. Layered Funding Plan

A central theme in the Task Force discussions was the need to achieve implementation of the program through the use of multiple funding strategies and sources. One of the most popular strategies is the reallocation of acquisitions funds from those "associated with building a self-sufficient collection" to "those associated with cooperative collection development and sharing." [4] A second principle is the shift in priorities from acquisitions expenditures to document delivery. Part of the current financial commitment from research libraries would be transferred from acquiring and processing materials to retrieving or transferring materials needed by scholars.

This shift implicitly requires a fundamental change in the ways research libraries operate. Libraries will have to reconsider the allocation of financial resources among maintaining on-site collections or providing access to remote resources, and supporting digitized materials or maintaining print-based materials.

The Task Force funding strategy calls for a three-tiered funding plan. One primary source of funding is utilization of existing acquisitions budgets. Participating institutions will provide a base level of funding to increase acquisitions in targeted areas.

The second source of funding is cost recovery for document delivery. Libraries that are not participating in the program, but relying on access, will reallocate funds from their acquisitions budgets to document delivery. Payments for interlibrary delivery of materials acquired under the terms of the system will depend on the terms of the individual institutional policies.

Outside grants are the third source of funding. It is anticipated that the establishment of the plan will be a magnet for funding from a variety of sources. Libraries designated as resource deposits may be able to use their participation in the program as a marketing tool for local fund-raising efforts. The Task Force also recommends that AAU and ARL develop an initiative for federal funding of a foreign acquisition program, perhaps in conjunction with Title VI Centers.

IMPACT ON FACULTY

In the last decade, research universities have invested heavily in information technology. Since the mid-1980s, telecommunications networks have changed dramatically. The dramatic growth in the Internet, availability of fiber-optics, and implementation of local area networks have revolutionized access to and distribution of research materials. The advent of relatively low cost, high powered desktop computers has made it possible to store, transfer and retrieve whole texts electronically and rapidly, thereby transforming the ways scholars are gaining access to needed materials. The current technology of electronic catalogs and bibliographic databases makes the process of searching for needed materials less cumbersome.

Enhanced access to scholarly information has also increased pressures on the traditional process of interlibrary lending and borrowing. Despite recent initiatives to modernize interlibrary loan programs, it is the shift to electronic resource sharing that will finally create the foundation for pooled resources. This will require each institution and research library to consider the most effective ways for allocating resources within a multi-institutional framework for access to information.

The greatest incentive for faculty and researchers to embrace the proposed plan will be the ease with which they will be able to identify, locate and access foreign language and area studies materials. If faculty and researchers see the plan as a way of removing impediments to research and increasing the availability of research materials, they will be more willing to support the new system. If campus communities are convinced that the plan is both cost-effective and offers improved access, they will also be more likely to embrace it.

Therefore, the demonstration projects must address the major problems currently impeding access by users to foreign language and area studies materials, namely: coordination problems, technical impediments, human resource and political issues. Lack of coordinated collection development among campuses and insufficient coordination between federal agencies charged with providing information, and between North America and foreign countries, are all issues which must be addressed in order to make a distributed, cooperative plan succeed.

Specifically, the three demonstration projects must address the concern among those who depend on library collections that spending on enhanced access will not diminish available foreign research materials. Also, intellectual property and other ownership questions must be answered in order to ensure scholars that these legal barriers have been overcome. Finally, technical training for campus users and librarians will be necessary to enable optimum use of the plan's resources.

All the strategies considered for educating campus constituencies should view area studies librarians and bibliographers as key players for providing training. They can serve as important resources on campus, by building on their subject knowledge and adding technical expertise. Professional associations in area studies and foreign languages can also be tapped as educational resources for their members.

On many university campuses the central office of international education should promote the goals and strategies of the proposed program and build bridges of communication to all campus constituencies. Successful implementation of the demonstration projects will require the active participation of foreign area faculty, directors of international programs and university administrators. All these players must be engaged in implementing the chosen strategies on each participating campus.

IMPLEMENTATION STRATEGY

In order to achieve the ultimate goal of a distributed North American collection, three demonstration projects will be launched to show how different world areas can be incorporated into an overall program. They will also aggressively test the barriers to distributed access and evaluate the impact of the plan on scholars communication and research.

The initially targeted areas will include Latin America, Japan and Germany. These area's needs for foreign acquisitions have been identified by the ARL Foreign Acquisitions Project and they each have the personnel necessary to implement the program. These areas were also chosen because external funding is strong and because it will be possible to build on current national interests in foreign acquisitions. They will also illustrate how the program will be impacted by differing levels of network capabilities and electronic information.

The rationale for Latin American acquisitions is threefold. First, the Seminar for the Acquisition of Latin American Library Materials (SALALM) could provide organizational support. SALALM has a successful record in facilitating cooperative collection development programs. Second, The Andrew W. Mellon Foundation has recently indicated its intent to provide substantial funding for building a hemisphere-wide, distributed system for Latin American library resources between North and South American research libraries. Lastly, electronic resources are just starting to become available in Latin America, where research has traditionally relied upon print-based material.

The demonstration project for Japanese language materials focuses on scientific and technical journals and serials. The Japanese collections in North America have already made substantial progress in resource sharing in the field of area studies. However, there has been a dramatic growth in Japanese research and an accompanying increase in demand for its results. The demonstration project would therefore build on the current support for network connections among the participants of the recently established National Coordinating Committee for Japanese Libraries. This focus on scientific and technical serials is different from the focus of the other two demonstration projects and may open avenues to new sources of funding, such as the Japan Society for the Promotion of Science.

The German acquisitions project is geared toward focusing on the "high impact" area of Western European studies. The number of faculty in this area is already substantial, the number of titles routinely collected is considerable, library research materials are expensive, and the booktrade and subject bibliographers are well-organized. Finally, digitization technology is well-advanced.

These three demonstration projects will be the preliminary trials for larger program. They are designed to demonstrate that different areas of the world can eventually be incorporated into an cooperative program of shared acquisition and distribution. The preliminary project plans are described below.

PROPOSAL FOR DEMONSTRATION PROJECT FOR THE COORDINATED DEVELOPMENT OF LATIN AMERICAN STUDIES RESOURCES

1. PROJECT SCOPE

During the beginning phase, the project will focus on collaborative resource development for three types of Latin American research materials: journals and serials, government documents, and working papers and other publications of research institutes that prove difficult to acquire. Research libraries holding Latin American studies collections in North America have already made substantial progress in sharing resources and linking collections. Toward this end, the Seminar on the Acquisition of Latin American Library Materials (SALALM) fostered national-level cooperative collection development and forged strong links with the Latin American Studies Association (LASA). The proposed project will build on these efforts and develop the mechanisms for dividing responsibility for collaborative collection management among North American research libraries.

2. PROJECT METHODOLOGY

This blueprint for the demonstration phase is the result of a special planning effort by the newly appointed Steering Committee for the Latin American Demonstration Project. The Steering Committee identified three objectives that are to be accomplished during the first year. They are:

1. To identify less expensive ways to acquire copyrighted materials in order to reallocate funds which can be used to maintain and enlarge holdings of core and new materials. The vehicle for addressing this problem is collaborative, distributed management of journals published in Latin America.

2. To provide increased access to valuable non-copyrighted materials using newly developed technology. Currently, the Library of Congress acquires the major government documents from Latin America. The problem will be addressed through a feasibility study on the effect of digitization technology on the availability of these materials across the nation.

3. To create depositories for and wide access to copyrighted materials whose information will soon become outdated. The vehicle for addressing this objective is the collaborative acquisition of working papers and technical reports issued by research institutes in Latin America.

Implementing the three-pronged program will require institutions to share the responsibility for acquiring the resources and making them accessible. It will also require an assessment of institutional readiness for electronic resource sharing. Also, a determination will have to be made on the feasibility of utilizing an existing information network service such as UT-LANIC (operated by the Latin American Network Information Center at the University of Texas in Austin). Finally, a decision must be made on which documents will be selected for access and distribution. To undertake these tasks, the Steering Committee has recommended the appointment of a full-time coordinator to oversee the start-up period.

3. PARTICIPANTS

In general participants would be selected according to the following criteria:

A. Strength of Latin American studies programs and collections, including size/scope of collections; availability of technical and fiscal resources to contribute to the project; needs of faculty and researchers; and demand for Latin American studies resources.

B. The desire of the institution to participate in the program. This includes libraries in need of Latin American studies materials which are able to commit resources.

4. GOVERNANCE

ARL will provide the administrative umbrella for fund-raising support, coordination with other demonstration projects, and project evaluation. However, the demonstration project will be coordinated by the existing Steering Committee composed of representatives of research institutions and participating organizations, including SALALM, LASA, and the Library of Congress.

5. FUNDING

ARL will prepare an initial grant proposal to The Andrew W. Mellon Foundation for the funds for the project coordinator and the start of the demonstration project.

Participating institutions will be required to commit to the project a percentage of their resources currently provided for Latin American acquisitions. They will also be expected to increase their contribution throughout the course of the project by reallocating existing funds or through local fund-raising efforts. The ARL administration will be charged with coordinating efforts to raise a percentage of the annual project cost (including costs of enhanced library technology and acquisitions) through public and private sources.

PROPOSAL FOR DEMONSTRATION PROJECT FOR THE COORDINATED DEVELOPMENT OF JAPANESE LANGUAGE SCIENTIFIC AND TECHNICAL SERIALS IN NORTH AMERICA

1. PROJECT SCOPE

This demonstration project will focus upon Japanese language journals and serials in high impact science and technology fields. The implementation of the Ohio State University Digitization Project and the use of existing tele- communications technology will offer the potential for networked access. During the past five years, research libraries holding major Japanese collections in North America have made substantial progress toward a network-based distributed program of acquisitions in traditional area-studies fields. The proposed project will build on these efforts and broaden its scope to encompass scientific and technical resources. It will also establish close links with the new Library of Congress Japan Documentation Center. The ultimate goal will be to expand access to and improve delivery of journal articles.

Initial project objectives are to create a union list of available Japanese science and technology journals in North American research libraries; to include the titles in major indexing and abstracting services; increase the availability of English language abstracts, and selective or cover-to-cover translations; identify additional journal titles for cooperative acquisitions; offer tables of contents of selected journals electronically; and improve the mechanisms for electronic delivery of science journals.

2. PROJECT METHODOLOGY

Determining the project's methodology will require a better understanding of existing activities in North American research libraries as well as federal government programs. The most effective way to begin is to work with the universities that currently operate Japan STI programs. This approach will help in identify the core group of potential project participants.

The critical first step is to determine existing holdings of major journal titles, determine the most effective ways to improve access, and identify the additional journal or serial titles that should be acquired. The Diet Library Directory of Japanese Scientific Journals will be used as the tool for determining available and needed journals. It will also determine coverage of the major journals in abstracting and indexing services.

The project participants will be responsible for identifying other alternatives, if needed, as the demonstration project evolves. One such alternative may be to begin the project in one or two selected fields, such as computer science or biotechnology.

3. PARTICIPANTS

In general participants would be selected according to the following criteria:

A. Strength of Japanese science and technology program, including size/scope of collections; technical and fiscal resources to contribute to the project; needs of faculty and researchers and demand for Japanese language STI.

B. The desire of the institution to participate in the program. This category would include libraries which need access to Japanese science journals and which are able to contribute the necessary resources.

4. GOVERNANCE

ARL and the National Coordinating Committee on Japanese Library Collections will provide the administrative umbrella for fund-raising support, coordination with other demonstration projects, and project evaluation. However, the demonstration project will be self-directed by a Steering Committee composed of representatives of participating institutions.

5. FUNDING

ARL and NCC will prepare an initial proposal assessing the level of current efforts and needs.

Participating institutions will be required to commit to the project a percentage of their resources currently provided for Japanese acquisitions. They will also be expected to increase their contribution throughout the course of the project by reallocating existing funds or through local fund-raising efforts. The ARL administration will be charged with coordinating efforts to raise a percentage of the annual project cost (including costs of enhanced library technology and acquisitions) through public and private sources. Potential funding sources include the Japan Society for the Promotion of Science, the Japan-United States Friendship Commission, and corporate sponsors.

PROPOSAL FOR DEMONSTRATION PROJECT FOR THE COORDINATED DEVELOPMENT OF GERMAN RESOURCES

1. PROJECT SCOPE

The proposed project will include topics in history, political science, sociology, anthropology and economics in all languages published in Germany. The final determination of scope will be the responsibility of the project participants. This determination will depend upon the relative strengths and needs of research programs and the subject and language specialties represented.

Determining the project's scope also includes defining and assigning the tasks to be accomplished. These include identifying and selecting participants; determining the roles of librarians, faculty and scholars; determining the level of administrative support to be provided by the Association of Research Libraries; developing a methodology for identifying and selecting appropriate materials; establishing evaluation standards to measure progress; and determining a schedule for acceptable progress, including review periods and identification of reports to be prepared.

2. PROJECT METHODOLOGY

The project will commence with the appointment of a Steering Committee consisting of faculty and librarians specializing in German studies, with expertise in social sciences. This Committee will be charged with determining the project scope, identifying and selecting participants, drafting contractual agreements, and establishing the project schedule. They will also provide project oversight on a continuing basis, in close coordination with the ARL administration. The term of the demonstration project will be no greater than five years with interim reports issued at least annually.

The methodology criteria will be developed under the guidance of the Steering Committee and in consultation with all participants. The process will be based on the individual strengths and needs of the participants and will include responsibilities for selection, cataloging, digitizing (and other access/preservation processing), and accessing materials in all formats.

3. PARTICIPANTS

Fifteen to twenty participating institutions will be selected according to the following criteria:

A. Strength of the collections program, including size/scope of collection and rate of current acquisitions of materials in all formats; availability of technical and fiscal resources to contribute to the project; experience and skill of faculty, librarians and support staff, including subject/area/language disciplines represented, networking and other technical skills.

B. Geographical representation, including Canadian libraries.

C. Desire of the institution to participate in the program. Including consideration of libraries of any size or type which that are able to commit resources to the project and need access to German research publications. This includes national, foreign, special and independent research libraries, and institutions that are part of complementary programs such as the DOE Title VI national resource centers and members of the Center for Research Libraries.

4. GOVERNANCE

ARL will provide the administration for fund-raising support, coordination with other demonstration projects, and project evaluation. The project will be self-directed by a Steering Committee composed of the participants, including, collection specialists, a liaison to the ALA West European Studies Specialists, representatives from faculty, and representatives from library technical processing and document delivery specialties.

5. FUNDING

Participating institutions will be required to commit to the project a percentage of their resources currently provided for German acquisitions. They will also be expected to increase their contribution throughout the course of the project by reallocating existing funds or through local fund-raising efforts. The ARL administration will be charged with coordinating efforts to raise a percentage of the annual project cost (including costs of enhanced library technology and acquisitions) through public and private sources.

EVALUATION OF THE PROGRAM

Careful evaluation of the three demonstration projects and any future area-based programs will be a critical step in moving toward a comprehensive program for foreign acquisitions. The Task Force recommends that ARL and AAU jointly coordinate the assessment of the demonstration projects. In measuring progress, evaluators will want to be assured that:

- Research libraries in North America have restored and are maintaining acquisitions of foreign materials at levels adequate to North American needs.
- Significant progress has been made in assuring effective and timely access to and delivery of foreign research materials. Specifically, campus networks and their electronic infrastructures have been developed sufficiently to support selective electronic resource sharing and that interlibrary loan services have been modernized.
- The projects have developed realistic financial strategy that incorporate reallocation as a central funding source.
- Foreign area specialists and other faculty who routinely rely upon foreign language materials have become convinced that the program is producing improved access. The impact on users is a critical factor.

To facilitate ongoing monitoring, the Task Force advocates that annual reports be specified, cumulated and widely distributed. Also advocated is a rigorously performed mid-term review in the second year. At the end of the 5-year period, a final review will be performed.

Endnotes

1. Anthony M. Cummings, *et.al. University Libraries and Scholarly Communication: A Study Prepared for the Andrew W. Mellon Foundation*. Washington, DC: Association of Research Libraries, 1992: 142.

2. Ibid.: 70-76.

3. Ibid.: xiv.

4. Ibid.: 142.

RESEARCH LIBRARIES IN A GLOBAL CONTEXT

An Exploratory Paper

This paper was originally prepared by ARL Staff
for the ARL Board of Directors and the ARL
Committee on Collection Development

Prepared December 1989
Revised October 1992

RESEARCH LIBRARIES IN A GLOBAL CONTEXT

Research libraries are the hub of a nation's intellectual enterprise. Over the last decade, North American research libraries have faced many pressures: expanding scholarly disciplines and the growth of interdisciplinary studies; the demands of scholars for new and expanded services; the increase in the number of formats collected; the need to preserve the collections from the ravages of decay; the move to online catalogs; and budget constraints that affect all library efforts. These challenges will continue. At the same time, new external factors are exerting increasing pressure on libraries and their parent institutions as they seek to serve scholars' needs. These include:

- **Transformations in Eastern Europe and around the world.** In Eastern Europe and the former Soviet Union the political upheavals have resulted in extraordinary changes. The changes - political, social and economic - are linked and will impact the entire world. Substantial changes are also occurring along the Pacific Rim and in Latin America.
- **Impact of the global marketplace.** The North American business community has found its marketplace as well as its competition to be global. The need for personnel well-trained in the cultures and languages of the world is increasing. A editorial in *The Washington Post* states, "Just about every country [the U.S. competes] with has met the challenge of imparting second- and third-language fluency to a substantial proportion of its citizens.[1] The fear that the United States and Canada will no longer be competitive in the world marketplace is real.
- **Expanding boundaries of scientific and technical research.** Scientific and technological efforts are increasingly collaborative on an international basis. Developments occur in laboratories around the world and scientists in the U.S. and Canada depend on awareness of these developments for progress in their own research. In addition, the results of research are increasingly being published outside North America.

Research libraries - faced with fulfilling the information needs of a world undergoing dramatic change, a business community participating in a global marketplace, and a research community working across international boundaries - have responded by turning to their collections and their supporting services. However, this may no longer be adequate. The 1980s and 1990s brought many changes: increased book production worldwide; the addition of expensive electronic materials to traditional print and microform resources; increases in prices - especially for foreign serials; and inflation and weakened U.S. and Canadian dollars. All of these factors contributed to a dramatic decline in the acquisitions of foreign materials. As foreign materials have become increasingly important, libraries' ability to acquire them has eroded.

Reductions in the acquisition of foreign language materials and foreign imprints began in the 1970s. Major contributing factors have included the demise of government and cooperative projects for foreign acquisitions, the impact of inflation and devaluation of Canadian and U.S. dollars, the difficulty of finding staff trained in foreign languages, and an undercurrent of an English-only attitude among library users. The recent escalation of serials prices and the resulting cancellation of foreign journals are only the latest manifestation of the problem.

Faced with the growing need for foreign materials, research libraries have also had to respond to costly demands for automation, preservation, and new services at a time when available resources are increasingly unable to support the full range of needs. Choices have been necessary and the acquisition of foreign material has suffered.

Each year research libraries in the aggregate are able to purchase a smaller portion of published foreign resources than the year before. This decline results in serious gaps in collections that pose a long-term threat to research and scholarship. The following findings highlight the fiscal problems and their impact:

- The costs of books and serials have risen more rapidly than other major categories of library expenditures during the last decade, and materials budgets have not kept pace. Data from the *ARL Statistics*, illustrated by the graph on page 40, compare the median cost of monographs and serials with expenditures and number of volumes or titles purchased for the past five years.[2]

- Analysis of statistics collected by ARL shows that ARL libraries in 1990-91 were able to buy only 85% of the new books bought in 1986. Serial expenditures have taken an increasing slice of the library budget, accounting in 1991 for more than three of every five dollars spent on on-campus materials. "If these trends persist by 1993 serials unit costs and expenditures will be double what they were in 1986."[3]

- The recent report on *The Acquisition of Latin American Materials* showed that 28 American research libraries with the largest Latin American holdings saw an increase in average expenditures from 1986 to 1990 of 17.7%, whereas the average cost of monographs reflected an increase of 43%.[4]

- The *Report on ARL Serials Prices Project* documents that the portion of the serials universe held by ARL libraries is decreasing markedly.[5]

- Subscription costs for foreign serials have increased dramatically over the past seven years, with the greatest increases occurring for serials published in Austria, Japan, The Netherlands, Switzerland, and West Germany. According to a recent study, 1993 subscription prices for non-U.S. titles will increase 9-10%, paralleling an actual 1992 increase of 9.3%.[6]

For both the United States and Canada, the crisis facing research libraries reflects an information crisis. Coverage of the global publishing output by North American research libraries, once thought to be comprehensive, is diminishing at a time when research is becoming increasingly international. Four perspectives help in understanding this issue:

- changes in global research and publishing patterns;
- shifts in information needs;
- collecting patterns of U.S. research libraries; and
- cooperative collection development programs.

Changes in Global Research and Publishing Patterns

Statistics compiled by UNESCO document the growth in the number of titles published worldwide, from 715,500 titles in 1980 to 842,000 titles in 1989. The UNESCO statistics further document the diffusion of book production and the continued growth in production in Third World countries. While the number of titles published in developed countries increased barely between 1980 and 1989 - from 570,000 to 579,000 titles - book production in Third

World countries grew from 145,000 to 263,000 titles in the same period. The statistics also bring into sharp focus significant shifts in publishing among the top ten publishing countries in the world.[7] The comparison of world book production between 1980 and 1989 shows that the U.S. share of world-wide publishing declined slightly. However, the 1980s saw the emergence of Japan, China, and Korea as important publishing centers. The Asian share of world book production increased from 18.8% in 1980 to 24.8% in 1989.

(The figures on page 41 capture the present status of world book production and the contributions of publishing outside of North America. It should be noted that the figures do not distinguish between research and non-research materials and include not only academic books, but all published titles.)

Analysis of the science and technology literature offers an additional perspective. *Science & Engineering Indicators-1991* allows a more detailed look at the distribution of publications in these fields. The share of research articles in core journals written by U.S. scientists and engineers has fallen from 38% in 1973 to 35% in 1987.[8]

Available information provides illustrations of the growth of non-U.S. science and technology publications. For example, in the BIOSIS database, U.S. authors published 25.91% of the source materials indexed in 1988, while Western European and Japanese authors published almost 40% of the papers. Another example is the steady growth of Japanese shares of publications. A study in *Science* notes, "in the 1973 through 1984 time frame, the number of Japanese-authored papers increased by 53%. In contrast, the number of U.S.-authored papers remained almost unchanged."[9]

Shifts in Information Needs

One major trend of the 1980s was the internationalization of information and research. Significant shifts include those occurring in foreign language studies and in the collaborative efforts of researchers. After the decline of foreign language studies in the 1970s, statistics from the National Center for Education Statistics show an upturn in the number of foreign languages doctorates and a rise in foreign language study. The availability of high speed computing and improved telecommunications has led to a dramatic increase in collaboration among researchers. Computer-literate scholars will increasingly conduct, advance, and share research through national and international electronic networks and databases in their respective fields.

As science and technology research and development increase in foreign countries, there will be corresponding growth in foreign science and technological publications. European science and Japanese commercial technology are increasingly important to science and engineering in North America. This is vividly illustrated by the fact that between 1980 and 1984, references in articles by U.S authors to articles by non-U.S. authors increased from 25% to 29%.[10] Such increases are expected to continue.

Europe includes five of the ten largest language groups in the world and is responsible for almost 44% of world book production. A look at the growth in book production in the major European countries documents the significant growth. As extraordinary political and economic changes are taking place projections forecast "a further sizable increase in the volume of European publishing, very likely for the next couple of decades and not only in the countries of Germany and Great Britain, where the national book production is already at an all time high.

Publishing activities have also been on the increase, and very impressively so, in France, Italy, and Spain."[11]

In recent years, concern has increased over the rapid advances by Japan in science and technology. Federal governments, the private sector, and universities and research libraries have expanded efforts to monitor Japanese science and technology and to acquire the resulting research information. However, few North American scientists and engineers are fluent in Japanese, and research libraries have not maintained strong collections of Japanese scientific and technical journals.

Collecting Patterns of North American Research Libraries

Historically, 40% to 60% of materials in major research collections have been foreign imprints. While estimates of foreign acquisitions vary from library to library or country to country, data from the Library of Congress, Harvard University, and several other research libraries confirm that research libraries are acquiring a declining percentage of the world publishing output.[12] A look at Library of Congress acquisition statistics shows that acquisitions from non-U.S. nations average 20% to 25% of output. The most troublesome aspect of that review is the marked decline in number of titles acquired by purchase from major areas of the world over the recent period.[13] The Library of Congress is not alone in the severity of the reductions. Another example comes from Harrassowitz, the primary vendor for German materials, which reported a 20% reduction in titles exported to the U.S. compared to 1985.[14]

Clearly, Western European materials remain important. And, while these materials are assumed to be widely available in U.S. and Canadian research libraries, the weakening of the U.S and Canadian dollars and higher prices for European materials have made acquisitions reductions inevitable. A study of European receipts conducted by the Library of Congress in 1991 indicated a steady increase in prices as well as a decline in receipts over the past nine years.[15] Libraries are most aware of the weakened value of the dollar when renewing periodical subscriptions, but the loss of purchasing power also affects libraries' acquisitions of foreign monographic imprints. For example, the average price of a European title is about $97.00 (U.S.).[16] This is more than twice the average price of U.S. titles.[17]

The limited efforts by research libraries to increase coverage of Japanese scientific and technical literature contrasts with the intensive U.S. response to meet the expanded demand for Russian language materials following the Soviet launching of Sputnik. Greater recognition is needed of the problem of limited availability of Japanese scientific and technical literature and its impact on research capacity.

An assessment of North American collections of foreign research materials is difficult because data on titles added by country of origin, expenditures for non-U.S. and Canadian imprints, and size of holdings have simply not been available. However, collection assessments offer circumstantial evidence of the problem of foreign acquisitions. One example is the 1985 Research Libraries Group (RLG) sample study of geology collections among member libraries. The study showed "the single most statistically significant factor in the failure to acquire (or the decision not to acquire) to be language. While foreign language materials represent only 22% of the entire sample (85 of 392), they comprise 55% of all items not held (38 of 70). In other words, the geology participants did not hold 45% of all foreign language titles. Russian-language materials fared particularly poorly."[18] Another RLG study carried out by nine member libraries with historically strong German collections indicated that of a random sample of 557 German research titles published in 1982, 27% of the survey titles were not held by any of the participants.[19] While these two studies focus on particular subjects, the collection evaluation data in the RLG Conspectus On-line provides a composite picture of research collections and indicates serious weaknesses in several foreign language areas.

Several other studies point to deteriorating coverage of foreign materials. A 1984 ARL membership survey on foreign acquisitions revealed significant gaps in materials from Middle Eastern and Asian countries There was also a general conclusion that coverage in North American libraries for foreign scientific and technical literature from non-European countries was particularly weak.

There is, however, an additional important consideration: an apparent trend toward collection homogeneity. As libraries reduce foreign acquisitions, there is an almost inevitable tendency to concentrate on acquiring only core titles. The long-term impact will be more overlap among collections and less coverage of the "universe" of foreign research materials. The danger is that collections will become even more limited and that areas outside the mainstream trade market will simply no longer be covered adequately by any library.

Cooperative Collection Development Programs

Over the years, research libraries have pursued a number of strategies to build comprehensive collections through cooperation in collection development. The establishment of the Farmington Plan after World War II was the most far-reaching effort to ensure that "one copy of every important foreign book" was available in the United States. The Farmington Plan exemplified the large-scale, decentralized system of specializations by voluntary agreements among American research libraries. By 1972, tensions between cooperative collection responsibilities and institutional priorities, the complexities of the subject allocations, the high costs of acquiring and processing materials, and the perceived inclusion of materials marginal to local interests all contributed to the decision to terminate the Farmington Plan. Among decentralized efforts to build cooperative acquisitions programs in area studies were the Latin American Cooperative Acquisitions Program (LACAP) which operated between 1959 and 1972, and the Public Law 480 program begun by the Library of Congress in the 1960s which is being phased out.

Research libraries have begun several ongoing coordinated programs. Among these is the National Program of Acquisitions and Cataloging at the Library of Congress, which supports acquisition and cataloging of research materials published throughout the world. The collecting programs of the Center for Research Libraries have enriched access to specialized foreign materials, especially to foreign newspapers, foreign dissertations, and foreign government publications. The Shared Resources Program of the Research Libraries Group is another important effort. Central to the RLG program is the assignment of primary collecting responsibility for certain categories of materials. Still another example is the Seminar on the Acquisition of Latin American Library Materials (SALALM), which has concentrated on improving support for and access to Latin American research resources. In addition to these highly visible cooperative efforts, many regional, state, and local cooperative arrangements have been carried out over the years.

The decline in foreign acquisitions has sparked concern among foundation officers and public policy-makers. For example, two important initiatives are the recent funding provided by the Henry Luce Foundation for support of eleven major Southeast Asian collections and the special funding by the Andrew W. Mellon Foundation for a cooperative program for Russian and East European acquisitions at Michigan and Indiana Universities. The U.S. Government has addressed foreign acquisitions to a modest extent, primarily through Titles II-C and VI of the

Higher Education Act (HEA) and the Japanese Technical Literature Act. Title II-C, Strengthening Research Library Resources, provides some funding for acquisition of foreign materials, though more II-C funds have gone to support improving bibliographic access to foreign materials. II-C grants in this area have focused primarily on the former Soviet Union and Eastern Europe, East and Southeast Asia, and Latin America. HEA Title VI was originally part of the National Defense Education Act. The centers for area studies funded by Title VI have provided some support for acquisition of foreign materials, especially periodicals. In 1991 first time funding of $500,000 was provided for foreign periodicals by the HEA Title VI, section 607 program. The Japanese Technical Literature Act has provided $1-2 million annually for Japanese technical literature translations and indexing of such translations by the National Technical Information Service (NTIS).

All of these efforts, both past and ongoing, provide valuable experience in coordinated collection development and help to define the limitations. They underscore the fact that libraries have achieved significant progress through collective action, but they also bring into sharp focus the fact that current efforts are quite limited. While some areas of the world receive needed attention, many others are without cooperative programs. Many of the questions that past cooperative efforts tried to address remain, but technology provides a new framework and new opportunities to address the issues.

What is Needed

In a time of flux in international affairs, an inevitable conclusion is that the production of foreign information resources will expand and costs will increase. It is time to focus renewed attention on the problem and to design new strategies. Research libraries are an integral, dynamic part of the changing information environment. They are and must remain gateways to the broadest world of scholarly information, regardless of country of production, language, or format. ARL's interest in foreign acquisitions is long standing and ARL and its Committee on Research Collections continue to pursue a variety of strategies and projects to strengthen research libraries' programs in this area.

The dimension and complexities of the foreign acquisitions problem call for serious consideration of several basic questions:

- What are the priorities for foreign imprint materials acquisitions by U.S. and Canadian research libraries as a group?
- What important gaps exist and what potentially unnecessary duplication could be reduced through a cooperative collection development plan?
- What is the level of both real and perceived need for foreign materials by researchers and scholars in various disciplines?
- What opportunities exist for expanded funding?
- How will changes in the information environment affect collection building efforts?
- What is the role of existing cooperative programs and what new capabilities are needed?

To address effectively the problems of foreign acquisitions and fulfill successfully their role in North America's research enterprise, research libraries must address the following concerns:

1. **Expanding North American holdings and access to the world's information output.**

   Research libraries have an opportunity to build on achievements in existing cooperative collection development programs, past and present, and on the strengths and continuing commitment to major foreign acquisition programs at the local, regional, national, and even international level.

2. **Creating new systems of affordable, effective access to foreign materials.**

   One important avenue for investigation will be to seek ways for capitalizing on the opportunities provided by the emerging National Research and Education Network (NREN). The goal of the proposed network "is to enhance national competitiveness and productivity through a high-speed, high-quality network infrastructure."[20] The implementation of NREN would allow research libraries to provide scholars with access to materials via expanded network services.

3. **Rethinking research library roles and relationships in providing access to foreign materials, especially expensive foreign serials.**

   No individual library can expect to be comprehensive in its coverage of the world's knowledge. ARL libraries must recognize the importance of further cooperative activity and be pragmatic about the roles of research libraries in a global context. Further, ARL libraries must articulate these changing roles and relationships to their parent institutions, to gain both their understanding of the problem and their financial support.

4. **Expanding funding sources for acquiring foreign materials.**

   Financial considerations, including the need to expand funding sources, will play a fundamental role in shaping potential strategies. The Mellon and Luce foundation initiatives highlight the significant contribution of this sector to improving foreign acquisitions in research libraries. Clearly, governments have a vital role to play in addressing the problem of foreign acquisitions and should commit significantly greater resources to this problem.

5. **Resolving issues related to the processing and preservation of foreign material.**

   The processing and preservation of foreign research materials present special challenges. Research libraries need to address these challenges as part of any foreign acquisitions program.

ARL Actions

A multifaceted response to the foreign acquisitions crisis is urgently needed. ARL places paramount priority on the formulation of cooperative strategies for developing and providing access to foreign materials located both in North America and abroad. In 1991 ARL launched a three-year project, *Scholarship, Research Libraries, and Foreign Publishing in the 1990s*. This ARL project is directed toward developing a clearer understanding of the forces influencing North American research libraries' ability to build collections of foreign materials. The intent is to mobilize major segments of the higher education community, including research libraries, in developing effective strategies and the resources needed to address scholars' foreign information needs. Support for the project is provided by the Andrew W. Mellon Foundation.

Project activities include:

- Developing joint projects with foreign area groups to analyze publishing output and research libraries' acquisition and delivery of foreign imprint collections. Seven projects are underway. The intent is to identify significant gaps in coverage and to establish priorities for foreign materials by broad world areas.

- Conducting pilot test studies that will focus on acquisitions needs for six areas, including Germany, Mexico, Russia, China, Japan, and Western African countries. Project task forces under the aegis of the respective foreign area group are being established. The goal is to test methodologies for establishing specific acquisitions targets.

- Working with the American Academy of Arts and Sciences, Midwest Center to bring together scholars and foreign area bibliographers to assist in developing a greater understanding of the needs of scholars in various disciplines and in determining priority needs and strategies for improving access to foreign materials.

- Establishment of an AAU Acquisition and Distribution of Foreign Language and Area Studies Materials Task Force to bring together research library directors, area studies librarians. scholars and university officials to address needs for foreign language materials and to build coalitions for securing needed funding.

These efforts will provide the needed context and framework for understanding the magnitude of the problem, for evaluation of alternative solutions, and for shaping ARL initiatives.

---

[1] "Foreign language distractions." - editorial, *The Washington Post*, December 15, 1989, p. A24.

[2] Stubbs, Kendon, "Introduction," *ARL Statistics 1990-91* (Washington, D.C.: ARL, 1992), p. 8. The data included here cover the years 1986-1993. *ARL Statistics 1992-93* (Washington, D.C.: ARL, 1994), p. 4.

[3] *Ibid*, p. 8-9.

[4] *The Acquisition of Latin American Materials, a report to ARL from the Task Force on the ARL Foreign Acquisitions Project* [by the] Seminar on the Acquisition of Latin American Library Materials ((SALALM)) [1992] p. 14.

[5] Okerson, Ann. "Of making books there is no end.- In *Report of the ARL Serials Prices Project* (Washington, D.C.: ARL, 1989).

[6] *Faxon Planning Report 1993* (Boston: Faxon Press, 1992), p. 24-25.

[7] *Statistical Yearbook, 1991* (Paris: UNESCO 1991)

[8] *Science & Engineering Indicators-1991*, p. 388.

[9] Narin, Francis, and J. Davidson Frame. 'The growth of Japanese science and technology," *Science* 245 (August 1989): 603.

[10] *Science & Engineering Indicators-1987* (Washington, D.C.: National Science Board, 1987) p. 289.

---

[12] Jutta Reed-Scott conversation with William Sittig, Director, Collections Policy Office, Library of Congress, November 16, 1989

[13] Library of Congress receipts for 1986 and 1987, *Library of Congress Information Bulletin*, February 8 1988, pp. 52-58 and Library of Congress monograph receipts for 1987 and 1988, *Library of Congress Information Bulletin*, January 16, 1989, pp. 19-25.

[14] Knut Dorn, "Champagne Taste", p. 4.

[15] *European Receipts of the Library of Congress* (Washington, D.C library of Congress, September 1991).

[16] *Academic & Research Book Prices Report, 1990-91 Approval Program Management Report* (New York: Baker & Taylor, 1991) p. 22.

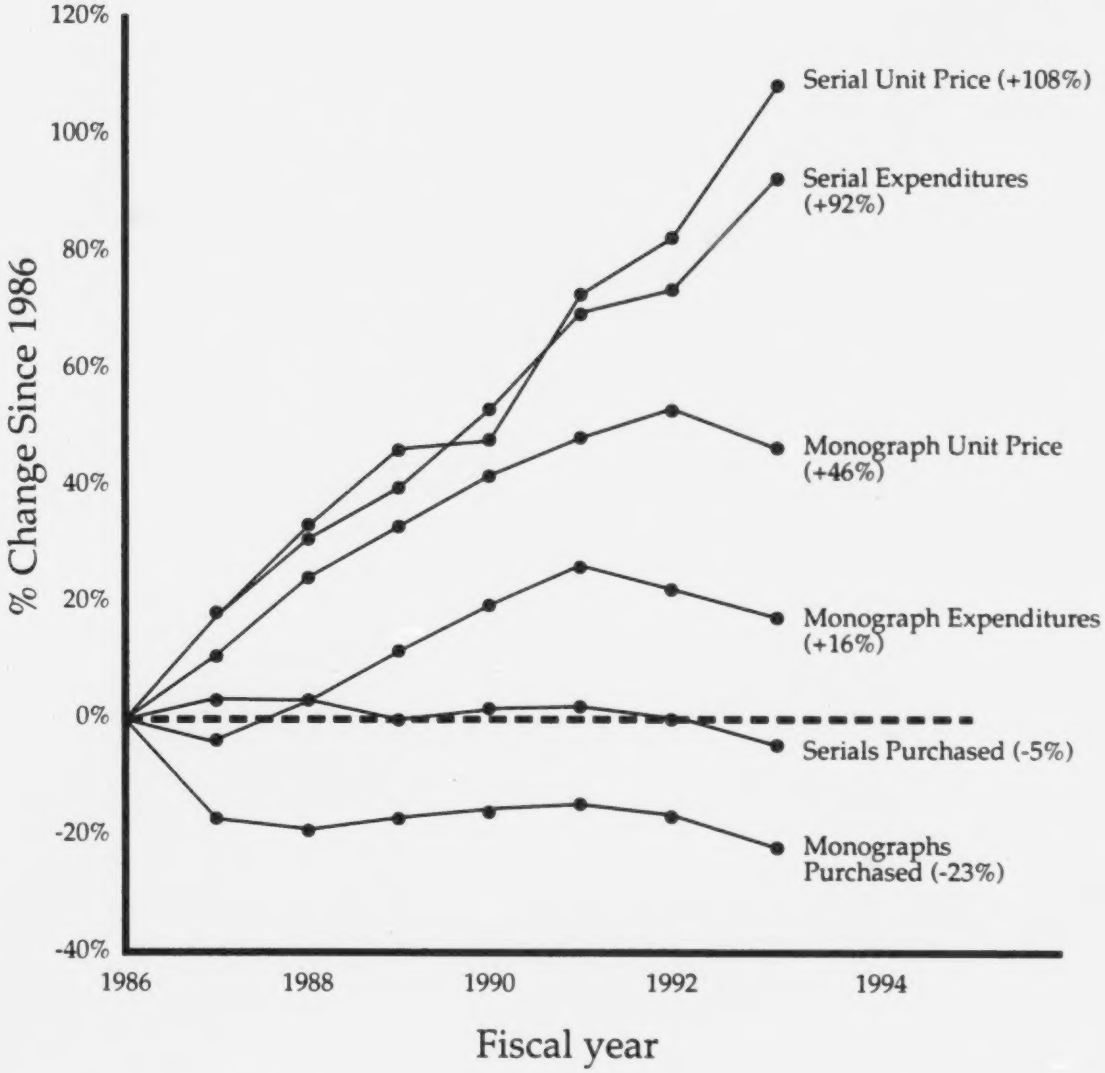
[17] Grannis, Chandler B., "Book title output and average prices: 1991 preliminary figures," *Bowker Annual Library and Book Trade Almanac*. 37th ed. (New York: Bowker, 1992) p. 506.

[18] Research Libraries Group, *Conoco Report* April 4, 1987, p. 10. Unpublished document.

[19] *Ibid* p. 7.

[20] *The National Research and Education on Network: a Policy Paper*. (Princeton, N.J.: EDUCOM Networking and Telecommunications Task Force, 1987) p. 1.

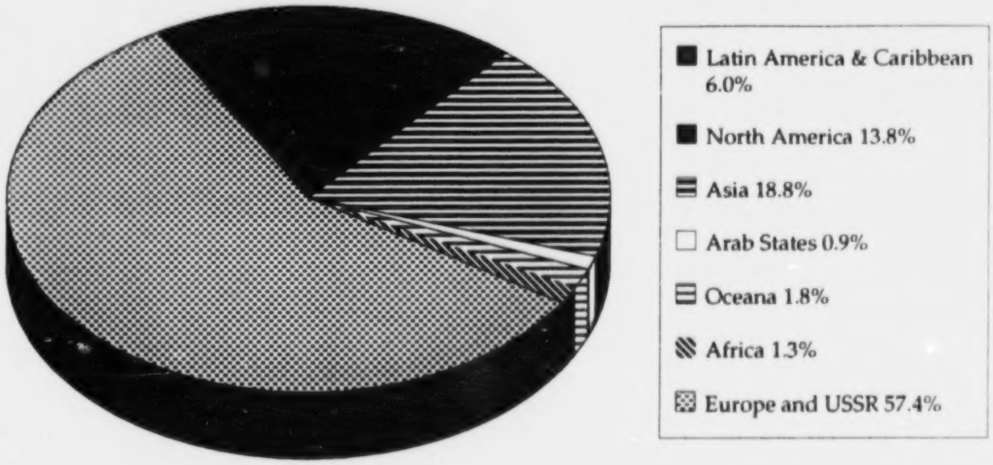
Monograph and Serial Costs in ARL Libraries, 1986-1993



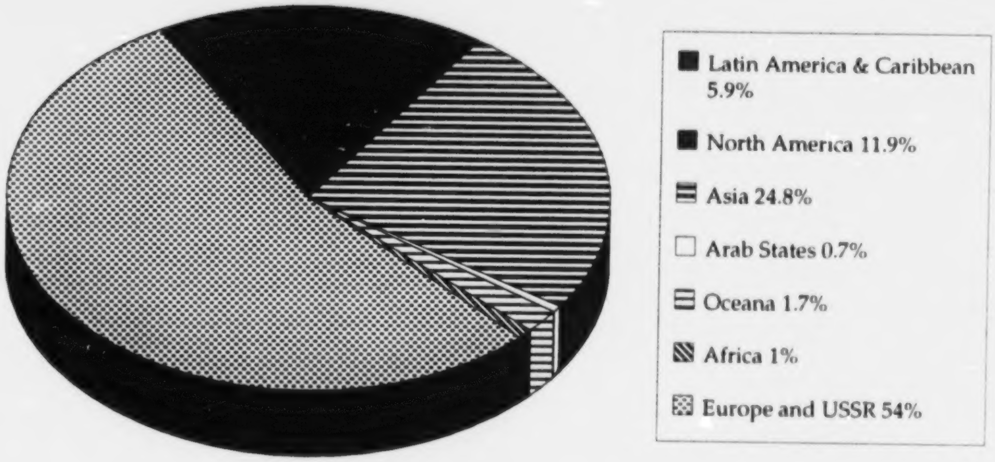
Source: 1992-93 *ARL Statistics*
Prepared by Kendon Stubbs; copyright © 1994 by the Association of Research Libraries

DISTRIBUTION OF WORLD BOOK PRODUCTION 1980 AND 1989

1980



1989



SOURCE: UNESCO Statistical Yearbook, 1991

Report of the AAU Task Force

on

A National Strategy for Managing Scientific and Technical Information

Submitted to the AAU Presidents Steering Committee
April 4, 1994
Washington, DC

Endorsed by the AAU Presidents
April 18, 1994
Washington, DC

TABLE OF CONTENTS

Task Force Members 47

Charge (AAU) 49

I. Overview & Recommendations 51

- A. Task Force Charge 51
- B. Advantages of New Models for Managing STI 51
- C. Potential for Innovation 52
- D. Potential for Cost Containment 52
  - The Impact of Copyright and a Monopoly-like Marketplace for STI
  - Pressures to Maintain Paper Collections of STI
- E. The Research Library and Campus Readiness for Change 54
- F. Task Force Recommendations 55

II. The System of Scientific Communication: A Framework for STI Management 58

- A. Three Approaches: Classical, Modernized, Emergent 58
- B. Why Universities Should Expect a Mix 62
- C. Advantages of the Modernized and Emergent Models 62

III. Reengineering Library and Campus Information Services 64

- A. Anticipating the Emergent Model: Building Partnerships 64
- B. Anticipating the Modernized Model: A Distributed National Library for STI 64

IV. Introducing Competition to the Marketplace for STI Publishing 67

- A. University Support for STI Electronic Publishing 67
- B. University Actions re STI Intellectual Property 68
- C. University Acceptance of STI Electronic Publications 69

V. A Role for the U.S. Government 70

Proposed National Repositories 70

VI. Implications for Research Libraries and their Institutions 72

VII. Opportunities for the University Beyond the Sciences 73

Appendices

A. The Landscape of STI 75

B. The System of Scientific and Scholarly Communication 79

C. Models of Scientific and Scholarly Communication 83
Classical
Modernized
Emergent

D. Economics of Scholarly Communication: A Working Bibliography 95

AAU Task Force on a National Strategy for Managing Scientific & Technological Information

Task Force Members

Richard West, Chair
Vice Chancellor, Business and Finance, California State University

Daniel Atkins
Dean of the School of Information and Library Studies, University of Michigan

G. Jaia Barrett (staff)
Deputy Executive Director, Association of Research Libraries

Alan Chodos
Professor, Center for Theoretical Physics, Yale University

Martin M. Cummings
Senior Consultant, Council on Library Resources

Brian Kahin
Director, Information Infrastructure Project, Harvard University

Donald Koepp
University Librarian, Princeton University

Jay K. Lucker
Director of Libraries, Massachusetts Institute of Technology

Susan Nutter
University Librarian, North Carolina State University

Paul Evan Peters (staff)
Executive Director, Coalition for Networked Information

Patricia Swanson
Assistant Provost, University of Chicago

Anne K. Vidaver
Head, Department of Plant Pathology, University of Nebraska, Lincoln

Ferris Webster
Professor of Oceanography, University of Delaware

Task Force on a National Strategy for Managing Scientific and Technological Information

CHARGE

This task force will consist of university administrators, librarians, and scientists that collectively bring expertise in scientific communication, library and information management, and telecommunications networks. It will examine new options for the collection and dissemination of scientific and technical information, giving particular attention to the concept of a distributed national science and technology library, a system of regional libraries responsible for the collection and dissemination of scientific and technological journals and related forms of communication.

Background: The rapid development of communication and computing technology is changing the way scientific information is created, disseminated, and used. Nonetheless, the preponderance of scientific information is provided through serial publications that are rapidly growing in number and price and are increasingly concentrated among a small number of commercial publishers.

The economic pressures on a captive university market, combined with new technological possibilities for handling information, can provide the motivation and the means to develop a system of regional libraries that would provide a nationally organized structure for managing scientific and technological information. Among other functions, such a system could collect and store serial publications which could be distributed electronically to local users. Canada has created the Canada Institute for Scientific and Technical Information which supports the highest level of interlibrary lending in North America. A similar system, regionally distributed to develop broad political acceptance and to accommodate the greater dimensions of the U.S. scientific and technological information enterprise, could provide a structure that would reduce collection requirements—and therefore costs—for individual universities while sustaining and even expanding access by students and faculty to scientific and technological information.

The computing networks currently being developed by the federal government and the private sector will provide the electronic communication system for handling national science and technology information flow. It is important for universities to participate in the development of such a system so that it reflects both the research and educational needs of those institutions.

Report of the Task Force on a National Strategy for Managing Scientific and Technological Information

I - OVERVIEW AND RECOMMENDATIONS

A. Task Force Charge

The work of this Task Force is part of the Association of American Universities Research Libraries Project, undertaken in collaboration with the Association of Research Libraries with the support of The Andrew W. Mellon Foundation. Since the initial project meeting in January 1993, some three dozen individuals from the academic community - librarians, faculty, technologists, and academic administrators - have worked in three Task Forces to focus university-wide attention on issues confronting university libraries and to identify long term, economic solutions for effective scholarly communication. The members of this Task Force were asked to address issues surrounding scientific and technical information (STI).

The Task Force on a National Strategy for Managing Scientific and Technological Information was charged by AAU to examine new options for the collection and dissemination of scientific and technical information that could break an extraordinary information cost spiral while at the same time support innovative applications of information technology. Specifically, the Task Force was asked to address the potential of a distributed national science and technology library, formed by a system of libraries to coordinate the collection and dissemination of STI journals and related forms of communication.

B. Advantages of New Models for Managing STI

To evaluate different options for managing STI, the Task Force adopted an analytical framework that describes the system of scientific and scholarly communication. The result of an analysis of that framework was three distinct models that depict different approaches to information management for STI -- the Classical, Modernized, and Emergent models (described in Section II and elaborated in Appendices B and C).

The term "model" is not used in this report in a predictive or prescriptive sense, rather the models are descriptive representations of ways that scholarly and scientific communication operate now and could operate in the future.

The Task force confirms that the technologies at hand -- and their creative application -- present opportunities for research libraries and universities to adopt new strategies to improve current library services as well as to make a qualitatively new contribution to the management of STI. Even so, institutions will be able to benefit from the advantages presented by new approaches to managing STI only when library services and operations are reengineered to support the new management models and when campus constituencies are provided with network-based, desktop access to remote STI resources that is convenient and reliable. At present, the Modernized and Emergent models tend to overlie and supplement rather than replace the Classical model, and while they offer advantages, the full scale adoption of these approaches is neither inevitable or easily accomplished.

C. Potential for Innovation

New technological tools for research, electronic networks, networked information, and creative application of information technologies are already transforming communication among scientists, scientific publication, and the way scientists receive and use information and data. The Task Force approached its assignment therefore with a shared vision of scientists with desktop access to campus, national, and even global networks and services that identify, locate, and deliver multiple forms of scientific and technical information, regardless of the physical location of that information.

Through the ability to express all media digitally, it is technologically feasible now to provide scientists with integrated access to STI collections in multiple forms. For example, the journal article and other page-formatted documents may be linked with scientific data, images and sound collections, as well as other forms of STI research resources. Hyper-media links and extends a page image to related information resources and will increasingly serve as an interface to the environment of networked information. Early forms of these capabilities are now in growing use through the rapid deployment of WorldWideWeb servers accessed through Mosaic. It is within such a dynamic environment that "digital libraries" or large collections of electronic resources are actively being defined and created.

Simultaneously, a new kind of scientific communication process has emerged that takes place entirely or primarily on electronic networks. For some applications, in particular those that involve teams of collaborating scientists, this process represents a fundamentally new approach to scientific inquiry. Traditional patterns of sharing research results are altered or bypassed. "Publication," as the academic community has come to recognize it, expands, and new ways are used to disseminate the dynamic research results for the use of other scientists now and in the future.

D. Potential for Cost Containment

For many participants engaged in the process of scientific communication, the costs of managing STI are hidden. This is largely due to the complexity of the process and the number of participants in the system. For most university scientists, STI acquisition costs are borne indirectly, in another part of the institution's budget -- the library. In fact, to address the problem of rising costs for STI research resources raises issues that extend beyond the research library and which are embedded in the economics of scientific publishing and the very culture of the university. Long term solutions are, therefore, complex.

Cost containment for collecting and disseminating STI within a university depends upon factors such as the following:

- The extent to which academic authors of STI retain copyright ownership and control of their intellectual property in a not-for-profit publishing environment;
- The extent to which universities and their libraries are able to influence the prices charged for acquiring the results of scientific research;
- The extent to which universities provide the tools and competitive outlets to receive, distribute, and archive STI; and

- The extent to which new strategies for managing STI minimize the need for every research library to maintain comprehensive, paper-based collections of STI.

Use of electronic networks and electronic publishing can perceptibly lower the costs associated with publishing (by eliminating cost for paper, printing, and distribution). However, if the educational and research community is to benefit from the lower unit costs from the use of electronic technologies, more competition must be injected into the current monopoly-like marketplace in order to moderate subscription prices.

The Impact of Copyright and a Monopoly-like Marketplace on Prices for STI

Most sciences are now served by an imperfect, monopoly-like marketplace for STI publishing. In the recent history of scientific communication, the publication of many STI journals has migrated into the hands of a few, very large commercial publishers. In a commercial environment of this nature, it is unrealistic to expect significant reductions in the cost of a library's materials budget for STI.

Scientists seek to publish in the most prestigious journals of their field. A common practice in the system of scientific publication is for the scientist author to be required to assign copyright to the publisher as a condition of publication. The institution then repurchases the article in journal subscriptions, using funds from library and/or departmental budgets. Because of the "scarce good" nature of the scientific journal -- in particular, the prestigious titles in each discipline -- there is no market substitute; publishers can and do charge extraordinarily high prices for these subscriptions. Because the ownership of articles is assigned to the publisher, the profit returns to the publisher -- not to the scientist author or to the institution that may have supported the research. And the control for the duration of copyright belongs to the publisher.

This situation has an unfavorable impact on the educational and research community because it allows prices for STI journals to be raised at rates that far exceed inflation. Until circumstances change (until the market stops buying), the cost of a library's materials budget for STI, especially for journal subscriptions, will continue to increase. In addition, it is reasonable to expect that the copyright fee imposed for the use of individual articles (over and above those uses granted by U.S. copyright law for educational and fair use) will be set by the publisher at levels that would make up for any revenue lost from cancellation of journal subscriptions. Until the marketplace for STI is changed in ways that cause STI publishers to lower their revenue targets, libraries and their universities should expect materials budgets for STI journals to continue to rise, whether the material is purchased as a subscription to a journal or singly from an article delivery service.

Therefore a key university strategy to realize long term cost advantages in the acquisition of STI is to introduce more diversified competition into the marketplace and thus moderate the prices charged for science journals and articles. The development of cost-based (instead of market-priced) electronic STI publications with high editorial standards could interject this competition into the current environment. University reward and recognition systems must also embrace electronic publishing as a legitimate outlet for publication of research results. Electronic journals must be able to compete in terms of academic legitimacy and editorial quality with traditional paper journals.

Electronic publishing of the results of scientific research is not an insignificant burden to ask universities or other not-for-profit organizations to assume. In some cases, the Task Force recognizes that additional financial support for such organizations is required to make this concept a reality. However, creation of competitive outlets for publishing STI remains the single most important action with potential for a long term solution to contain the costs associated with managing STI.

Pressures to Maintain Paper Collections of STI

The role of the library is to identify significant STI collections (in all formats); make judgments about which of these resources to acquire, organize, catalog, and index; provide current users with expert, professional services to make full use of the collections; and assure future users of access to significant collections through library preservation and maintenance of comprehensive research-level collections.

New information management strategies that exploit networks and new technologies present opportunities for improved performance of these functions, in particular the capacity to deliver STI to the desktops of scientists and students. These approaches also offer the potential, through resource sharing strategies such as a distributed national library for STI, to eliminate redundancy and therefore contain costs for some local library management functions such as cataloging, storage, and preservation. (However, under existing marketplace conditions for STI journals this approach alone should not be expected to result in long term savings in library materials budgets for STI.)

Factors affecting full-scale library adoption of new information management strategies include campus readiness to substitute desktop access for locally maintained collections of STI, and/or the extent to which the new publication and management options are developed to perform *all* the functions required for effective support of scientific communication. For example, until electronic articles or journals are archived to ensure their integrity and preservation for future users, scientists will continue to expect the library to acquire, maintain, and preserve journals in paper. Similarly, until a campus is networked (including "the last 100 feet") and access to desktop service is ubiquitous and reliable, convenient access to paper collections will continue to be a priority for scientists and students.

E. The Research Library and Campus Readiness for Change

Libraries have an impressive record of using technology and electronic networks to improve access to research collections and to automate bibliographic operations such as acquisitions and cataloging. In addition, in the last several years there has been an increase in library use of computer networks to send and receive page images of articles or other kinds of STI research materials. Libraries are also engaged in the establishment of standards and mechanisms to describe and locate electronic resources. The availability of digital full text on the networks may change the mechanisms used to describe and locate resources, but the function remains a critical element of the scientific communication process.

Campus information systems and policies need to accommodate the demands of a transformed system of scientific communication. It is also essential to ensure that any new national networking programs build upon and extend the progress achieved to date by NSFNET and provide universities with reliable network connectivity, with ease of use, and at a reasonable cost.

In addition, a campus-wide readiness is required if information professionals are to take full advantage of new technologies to deliver library services directly to scientists and students and to expand the range of STI resources made available via networks. This is in part technical readiness (networking, hardware, software, training); in part cultural readiness (change in traditional university practices and values); and in part leadership readiness to convince campus constituencies that a transformation in the institutional management of STI will improve access, will support the creation and management of knowledge for all disciplines, and will significantly strengthen the capacity of the university to pursue its mission.

It is important that science faculty, as authors and as consumers of STI research resources, collaborate with librarians to shape new options for managing STI. It is also important for university leaders to provide an impetus to secure necessary change in current university practices that will benefit scientific research and the academic community as a whole.

The changes the Task Force identified as necessary are not ones that can be mandated. Instead, they must be pursued by encouragement, example, and incentives. The recommendations presented do not offer simple solutions to "fix" the STI problem. In an environment of multiple participants, fast-changing technology, and limited resources, each institution needs to pursue a long term strategy for managing STI. What the recommendations propose are specific steps that AAU and ARL could take to help individual institutions to develop and implement such a long term strategy.

F. Task Force Recommendations

1. **Ensure that electronic networks and networking policies are in place to take full advantage of the technologies at hand and accommodate the demands of a transformed system of scientific communication.**

To ensure that electronic networks and networking policies are in place to take full advantage of the technologies at hand and accommodate the demands of a transformed system of scientific communication, AAU, in collaboration with ARL, should assist their member institutions to pursue three kinds of actions:

A. Collectively, exert an influence within national, state, and provincial governments to ensure that the legal and regulatory framework for communications will support affordable higher education access to a structure of national and global information networks (such as the information superhighway envisioned by the current U.S. Administration);

B. Collectively, promote public and private funding sources to assist higher education in creating and preserving digital collections of STI, and to encourage innovative network applications; and

C. Individually, establish a process to determine how to speed the completion and support of reliable network access to the offices of scientists and others who use STI, and to the dormitories and libraries used by students of the sciences.

2. **Introduce more competition and cost-based pricing into the marketplace for STI by encouraging a mix of commercial and not-for-profit organizations to engage in electronic publication of the results of scientific research.**

AAU and ARL should each adopt a policy statement that calls for more competition in the marketplace for STI publishing and encourage not-for-profit organizations to engage in cost-based electronic publication of STI research.

AAU, in collaboration with ARL, should provide their members with information on how a university can encourage not-for-profit organizations to create electronic journals that can achieve high editorial quality and prestige in the scientific community. Examples might be illustrations of institutional leadership, financial support, and university partnerships with scientific societies to establish, operate, and archive peer reviewed electronic journals, as well as examples of incentives that redirect copyright assignment for STI intellectual property from the commercial to not-for-profit publishers, or policies that support quality electronic journals as legitimate publishing outlets for faculty.

Comparable information could be exchanged with the Higher Education Funding Council of England, Committee of Vice Chancellors and Principals, a United Kingdom organization that is also seeking practical and effective ways to influence the marketplace for STI journals. In late 1993, the UK Committee received a commission report addressing the future of libraries in support of UK education and research in which issues comparable to those addressed in this report were raised. AAU was specifically identified as a potential trans-Atlantic partner in addressing the periodical pricing problem.

3. **Explore the feasibility of actions to mandate retention of the ownership of certain STI intellectual property in the not-for-profit sector.**

AAU, in collaboration with ARL, should commission one or more inquiries to assess the feasibility of the following actions to mandate retention of ownership of certain STI intellectual property in the not-for-profit sector.

> **University action:** University policies, practices, and mechanisms should retain in the not-for-profit sector some or all of the ownership rights of STI intellectual property that is created by university faculty and staff.
>
> **Government action:** Agencies of the U.S. Government that fund scientific research should, as a condition of funding, require that a copy of any report, data sets, or articles developed as a result of publicly-funded work, be deposited into an electronic repository that will provide public access.

The results of inquiries into the feasibility of such actions should influence an AAU implementation strategy to encourage retention of STI intellectual property in the not-for-profit sector.

For options for university action, see the *Report of the AAU Task Force on Intellectual Property Rights in an Electronic Environment*. For a proposal for action by U.S. Government science agencies, see Section V of this report.

4. **Promote establishment of a system of national repositories for scientific research to establish not-for-profit electronic outlets for STI .**

AAU, in collaboration with ARL, should take the lead to convene a meeting to develop an implementation plan for the proposed system of national repositories for STI as outlined in section V of this report. This system of distributed electronic repositories would provide the organizational structure needed to manage digital libraries of STI.

5. **Undertake a demonstration project to test the concept of a distributed national science and technology library.**

AAU, in collaboration with ARL, should test the concept of a distributed national STI library (see Section III B of this report) through a demonstration project with a consortium or federation of institutions with strong library collections of STI. Unless the marketplace for STI is changed, a distributed STI library will not lead to long term savings in library *materials budgets* but it can improve access and minimize the need for every research library to maintain paper-based collections of STI.

The proposed demonstration project centers on STI resources on biotechnology and computer sciences from Japan. This project was identified by the AAU Task Force on the Acquisition and Distribution of Foreign Language and Area Studies Materials.

6. Invest in and evaluate the results of new ways of managing STI (particularly ways that realize the Emergent model).

AAU, in collaboration with ARL, should monitor experiments or ongoing demonstration projects that seek to advance Modernized or Emergent models for managing STI, and produce a periodic assessment of these efforts in the context of the Task Force findings. Every such project should be assessed to determine the extent to which *all* the functional requirements of the system of scientific communication are performed, highlighting their acceptance by scientists and students and their cost to the institution.

7. Promote the awareness of the Task Force findings among all participants in the scientific communication process.

AAU, in collaboration with ARL, should encourage and support understanding and discussion of these findings within universities, in organizations of faculty, librarians, or university leadership, in scientific society forums, with agencies of the U.S. Government having responsibilities for science or STI, and with current and potential electronic publishers of scientific and scholarly information.

A heightened awareness among all participants in the scientific communication process, especially among science faculty in research universities, is essential to highlight these issues and the consequences of perpetuating the status quo.

II - The System of Scientific Communication: A Framework for STI Management

To evaluate different options for managing STI, the Task Force adopted an analytical framework that describes the system of scientific and scholarly communication. The framework identifies all functions of that system (e.g. authoring, informal peer communication, editorial review and validation, acquisition and access, location and delivery, preservation and archiving); the major participants in that system; and the performance attributes by which such systems are judged (e.g. timeliness, authenticity, cost).

The elements of the scientific and scholarly communication system as defined within the framework are elaborated in Appendix B of this report.

The framework provides a basis for comparing and contrasting different ways that scientific and technical information is created, shared with others, and used. The description of the framework may suggest a linear, orderly progression of scientific communication, even though the process itself is anything but. The functions may be viewed as "modules" which are performed at various times (or simultaneously) and which can be re-arranged in different information management scenarios. The framework accommodates all information formats and multimedia information. What will change, depending on how the information is managed, is the sequence in which the functions are performed, how well they are performed, and which system participants have responsibility for different functions at different points in the overall process.

Using the components of the communication system identified in the analytical framework, the task force formulated and evaluated different models of information creation, dissemination, and use. The term "model" when applied in this report to information resource management (IRM) is not used in a predictive or prescriptive sense. The models the Task Force identified are intended as descriptive representations of various ways scholarly and scientific communication operate now and could operate in the future.

A. Three Approaches: Classical, Modernized, and Emergent

The result of the framework analysis was three distinct models that depict different approaches to information management for scientific information. The STI management models are characterized as *Classical* (print-based), *Modernized* (defined in three tiers with a mix of paper and electronic inputs and outputs and increasingly direct computer access to university-generated writings), and *Emergent* (in which scientific collaboration, communication, and information sharing takes place entirely, or predominantly, on an electronic network).

The three scientific and technical information management models are described briefly on the following page. Figure 1 displays the key characteristics of the information transfer flows and how they differ in each of the three models; the models are described in greater detail in Appendix C.

Classical: The Classical, print-on-paper system of STI is exemplified by the traditional scientific journal. The print journal remains, for most fields, a primary model of scientific and technological communication. Traditional institutional support for managing STI was predicated on this model. For example, libraries were established and funded to buy, house, preserve, and provide retrieval services for STI. The rising cost of maintaining this approach to managing STI is a primary impetus to the work of this Task Force.

Figure 1

KEY CHARACTERISTICS OF THE STI* INFORMATION RESOURCE MANAGEMENT MODELS

INFORMATION MODEL	UNITS OF ACCESS	BASIC FORMAT FLOW
Classical	Journals	Paper Inputs -> Paper Access -> Paper Outputs
Modernized A	Articles, as well as journals	Paper Inputs -> Paper & Network Access -> Paper Outputs
Modernized B	Articles, as well as journals	Paper Inputs -> Paper & Network Access -> Paper & Network Outputs
Modernized C	Articles, as well as journals	Paper & Network Inputs -> Paper & Network Access -> Paper & Network Outputs
Emergent	Facts, as well as articles and journals	Network Inputs -> Network Access -> Paper & Network Outputs

Modernized: The Modernized model is to a great extent the current model, in that most of its functions are available today and overlie the Classical model. In the Modernized model -- which could also be called the "article delivery," "on demand," or "just in time" model -- information is still largely published and resides primarily in print form, but there is an array of expanding options for discovery and delivery. (An example of the transition from the Classical to the Modernized model is the evolving system for handling interlibrary loan and document delivery transactions; see Box 1.)

The Modernized model can also accommodate electronic journals that are authored and published in electronic forms and made available to library users via electronic channels. In the Modernized model, libraries can acquire fewer resources for local collections and rely on a growing number of remote sources for retrieval and delivery. An article or book need be acquired only if and when the user requests it (in paper or electronic form). The application of the Modernized model in this way presumes, however, that comprehensive collections of STI resources are still developed and preserved somewhere in order to supply libraries with this article delivery service. The issue is how to define the circumstances when it is advantageous to treat a given library as a consumer or as a provider of STI article delivery services.

Emergent: The Emergent model uses computing and communications technologies to share scientific instruments, primary data, and software as well as to support scientists in communicating and sharing information per se. These technologies are used for genuinely innovative purposes, rather than for the modernization of page-formatted information from paper to network storage and access media. Information environments generated by this model are sometimes referred to as "collaboratories." Examples include the human genome project and the global climate change initiative (briefly described in *The Landscape of STI*, contained in Appendix A to this report). Box 2 also gives further details about the Emergent model.

Box 1

Reengineering Interlibrary Loan

The traditional system of interlibrary loan to obtain books and copies of articles, reports, or other research materials not held by the local library has become strained by growing use. The system now performs erratically and represents an increasing cost to research libraries. The number of interlibrary loan transactions within ARL research libraries has climbed steadily: over a decade, borrowing increased 108% and lending increased 52%. In the last year, 1992-93, research libraries borrowed a total of 1.5 million items and loaned a total of 4.3 million items.

This upward growth is generally attributed to three converging trends: the development of more accessible and convenient to use bibliographic tools, including online library catalogs and other electronic indexes and access tools; a growing universe of published items; and reduced buying power for libraries as a result of increased costs for the acquisition of resource resources during times of constrained budgets.

Recent studies examined the system of ILL, identified the nature of its costs to the library, and recommended several solutions. [1] Especially for faculty and students in the sciences, electronic user-initiated article ordering and delivery services has emerged as a key strategy to supplement or replace ILL services.

ARL has initiated the North American Interlibrary Loan and Document Delivery (NAILDD) Project to facilitate the development of standards, software, and system design capabilities to improve ILL and DD services and make them more economical for research libraries. Also underway is an ARL process to assist libraries to redesign ILL operations to anticipate and accommodate new article delivery services. It is projected that these developments, when implemented by a library, will reduce by half the cost to the library for an ILL or article request. Given the volume of transactions, and no signs of a lessening in demand for this service, this is a significant cost containing strategy for libraries.

The Classical and Modernized models share the characteristic of information management as "post publication" functions. In each, the librarian or information manager typically becomes involved in the scientific communication process after publication of an article, journal, or book. The Emergent model differs in this respect, as it assumes involvement of librarians and other information managers earlier in the process of scientific communication. This distinctive feature of the Emergent model has implications for changing roles and responsibilities within institutions.

THE EMERGENT MODEL

We have only begun to realize the potential for information technology to transform the process of scientific research and communication. High-speed networks, software applications and major databases have laid the foundation for a significant change in the way science is done. The Emergent model describes a transformative approach to scientific research and communication which requires new ways to manage scientific information.

The Emergent Model accounts for the use of computing and communications technologies to share scientific instruments, primary data, and software as well as to share information per se. Information environments generated by this model are referred to as "collaboratories" in a recent report from the National Research Council (*National Collaboratories: Applying Information Technology for Scientific Research*). The term, a combination of "collaboration" and "laboratory," was developed to describe "an environment that enables scientists to make more efficient use of scientific resources wherever they are located." [2] The collaboratory is a direct response to the changing research needs of science: the need to address increasingly complex problems, the rising costs of instruments and facilities, and the increased competition for funding.

The Emergent model views each scientific community as a knowledge management system, and it calls upon scientists, information technologists, and librarians to act as partners in all components and activities of that system. In this model, information management is an integral part of scientific research from the project's beginning. While the Classical and Modernized models account for only some of the functions of scholarly communication (the "post-press" functions), the Emergent Model seeks to manage all functions of scientific communication: from information generation and creation through information use.

The Emergent Model is best exemplified by the Human Genome Initiative, which is aimed at deciphering the complete genetic code of the human genome. In the project, gene information is input, edited, stored, retrieved, and analyzed in an environment that supports geographically dispersed laboratories that conduct genome mapping and sequencing research. While traditionally, molecular biology research has been conducted on a small scale, a paradigm shift in biology has made collection of data on genes a primary goal. This multidisciplinary, multi-institutional and geographically dispersed research endeavor is encouraging collaboration and data-sharing on a large scale, producing vast amounts of information in multiple formats that could only be managed with new technologies. The Human Genome Initiative illustrates a key factor of collaboratories: that "progress in scientific labs becomes increasingly dependent on the availability of powerful computer technology, easily accessible data repositories, and sophisticated analytical software."[3]

The National Science Foundation, in its Digital Libraries Initiative, recognizes the need for a distributed technology environment which would dramatically reduce barriers to the creation, dissemination, manipulation, storage, integration and reuse of information. The initiative is designed to encourage research on digital libraries that would both support current research and education practices and accomodate new forms that will develop. The NSF has also funded the Upper Atmospheric Research Collaboratory (UARC) Project to investigate the creation and application of an emergent "collaboratory" model to support distributed collaborative science in ways that reduce barriers of both time and distance.[4]

The technologies that will facilitate the Emergent Model will "provide a technological base specifically created to support interaction among, scientists, instruments, and data networked to facilitate research conducted independent of distance." [5] This is also the base required to support research university functions such as distance learning, independent education, worldwide education, and industry/education collaboration. Fostering the Emergent Model by investing in the infrastructure --technical, financial and human-- is a strategic investment that will also foster other goals of the research university.

B. Why Universities Should Expect a Mix

Universities should expect that a mix of scientific and technical information management models, including the Classical, is inevitable. Figure 2 postulates the mix of management models for the next twenty years. The deployment of multiple models of information management will not progress uniformly largely because not all scientific disciplines will embrace electronic technologies at the same pace. In as much as the rate of institutional change will vary, it is realistic to assume a dynamic mix of IRM models for several decades.

The Task Force's review of current and anticipated applications of the models for STI concludes that the Modernized and Emergent models tend to overlie and supplement rather than replace the Classical model. This is due in large measure because applications of the Modernized and Emergent models are not yet fully developed. The transition from the Classical to the Modernized and Emergent models for STI is not inevitable.

It is important for an effective information management strategy to perform all of the functions of the system of scientific communication. For example, for electronic journals or articles to substitute for their paper equivalents, the electronic versions must receive peer review, be accepted as equal in prestige to traditional paper journals, and be archived to ensure their integrity and preservation for the future. While the task force reached consensus that the Classical, paper-based model is, over the long term, both unaffordable and unresponsive to new scientific communication patterns, it concluded that it will be sustained until the other models are more fully developed.

C. Advantages of the Modernized and Emergent Models

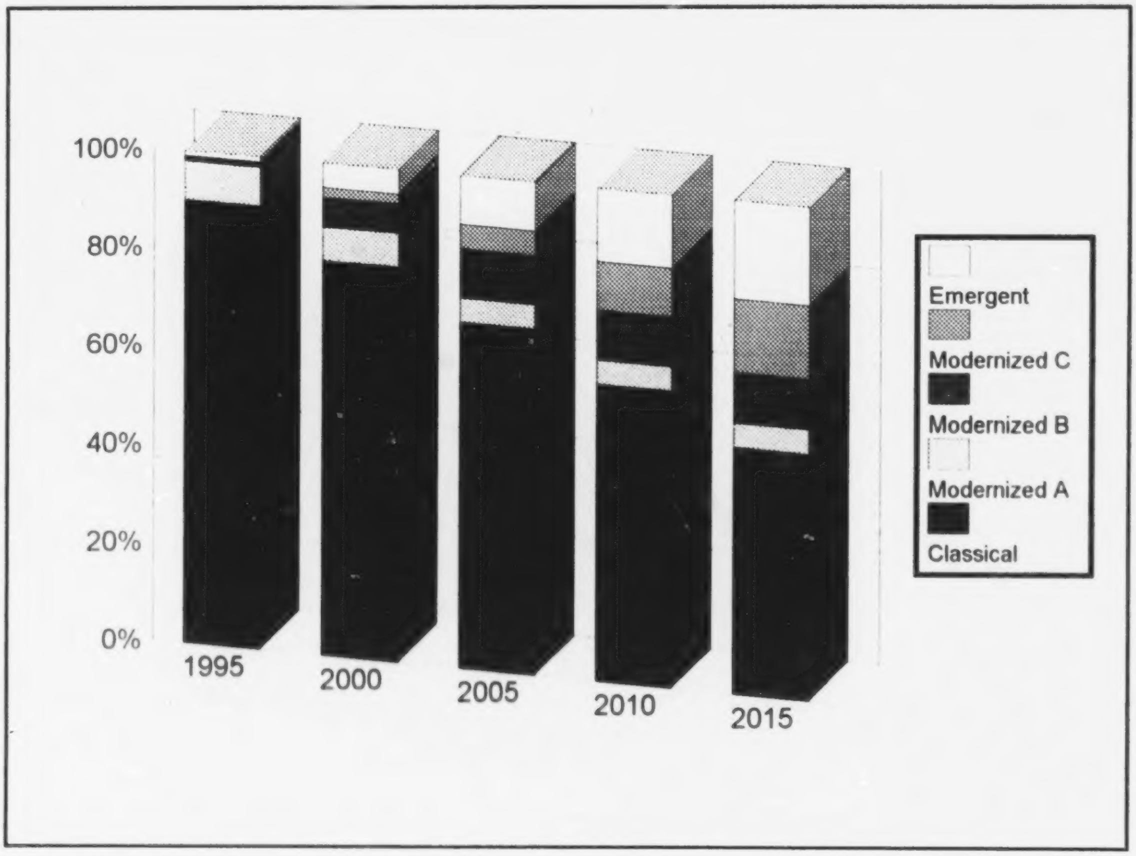
To differing degrees, both the Modernized and Emergent models rely on networked information and/or electronic networks for dissemination of research resources. The use of electronic formats instead of paper permits improved performance, particularly in the functions of storage, access, and delivery, and potentially in acquisitions and information management (cataloging). Access and delivery to local and remote resources could be faster and funds could be reallocated from ownership of a book, journal, or datafile to payment for use of such resources from remote sources; this would reduce local costs of acquiring and cataloging material.

To the extent that the Classical model is *replaced* by the Modernized and Emergent models, the kind of library facilities required would also change. There would be less need for expanding stacks to shelve paper materials and more need for space configured for user workstations, for meetings among users, and for people to work together with librarians on research design and effective use of local and remote networked collections. However, until a campus is networked (including "the last 100 feet") and access to desktop service is ubiquitous and reliable, convenient access to paper collections will continue to be a priority for scientists and students, and the Classical model will be perpetuated.

It is therefore advantageous to complete the development of the Modernized and Emergent models to perform the full range of functions required for scientific communication so that research libraries can employ them and minimize the use of the Classical, paper-based model for managing STI resources. There is evidence from institutions represented on this Task Force that this shift has already begun as library expenditure trends show a slowing in the amount spent to purchase printed materials and an increase in that spent on electronic resources; institutional expenditures for networks are also going up along with usage of the networks.

Any reduction in spending on one function or activity may not result in cost savings to an institution. Some cost savings may lead to reallocations within a library budget (that can seed projects to pave the way toward the Modernized and Emergent models), and/or result in cost shifts within an institution (e.g., among the library, computer center, university press), among institutions, and/or from the institution to the individual user. The economic impact of new models of STI management is not fully predictable. What is needed are ongoing assessments of experiments and demonstration projects to inform better our judgment about where and how real costs may be contained. Examples of previous and ongoing assessments are noted in *The Landscape of STI* included in Appendix A of this report.

Figure 2 - STI Information Resource Management Models
Estimated Institutional Use of Information Models by Year



*Scientific and Technical Information

III - Re-engineering Library and Campus Information Services

As Figure 2 suggests, libraries will not be able to benefit from the cost advantages presented by new approaches to managing STI until the Modernized and Emergent models are developed to a point where they replace the Classical model. To speed and anticipate this transition, library services and operations need to be reengineered to support the new management models and campus constituencies need to be provided with network-based, desktop access to remote STI resources that is convenient and reliable.

A. Anticipating the Emergent Model: Building Partnerships

The information management roles or responsibilities of scientists and librarians within an institution will differ depending on the information management model. The Classical and Modernized models will continue the traditional roles and relationships. The Emergent model, however, transforms how scientists and librarians have customarily interacted and accomplished their work. The resulting new roles require organizational flexibility and may lead to structural change in an institution.

One anticipated change will be the involvement of librarians at points early in the scientific inquiry and communication cycle. In the Emergent model, teams of scientists and librarians work together to create specialized databases and tools in an interactive, electronic environment focused on the specific needs and problems of a given user community. Partnership among scientists and librarians constructs a process that maximizes the usefulness of data gathered and information generated.

The Task Force discussions did not prescribe specific ways the partnership between librarians and scientists should evolve. However, they did underscore the importance for institutions to engage in projects that build working partnerships among scientists, librarians, and other information professionals on university campuses. Such projects will combine expertise, create technology that better meets scientific needs, enable conceptualization of new research problems because tools and instruments are in place or can be developed, and ensure that information is organized early in a project. Demonstration projects that build these partnerships and capabilities will leverage the benefits of new technologies and develop new modes of scientific inquiry.

B. Anticipating the Modernized Model: A Distributed National Library for STI

The concept of a distributed national STI library presumes that certain designated libraries operate in a nationally organized structure to manage STI and provide electronic distribution to remote users, thereby reducing collection requirements -- and costs -- for individual universities while sustaining and even expanding access to STI by students and faculty. This could contain library costs for managing STI by reducing time and resources required to acquire, catalog, house, and preserve local collections. Technology makes a coordinated collections strategy feasible, and it expedites article delivery services. However, under existing marketplace conditions for STI journals, this approach should not be expected to result in long term savings in library materials budgets for STI.

The concept of a national STI library is not untested. In 1974, the National Research Council (NRC) of Canada, an agency of the Canadian federal government, established CISTI, the Canada Institute for Scientific and Technical Information. It is the successor to the National Science Library that was originally established in 1924. CISTI maintains the largest collection of published information in science, technology, and medicine in North America. The collection consists of half a million books and conference proceedings, over 50,000 serials and more than two million technical reports. The collection catalog can be accessed electronically, as can CISTI's online article ordering and electronic delivery capability. CISTI also provides online database services through its CAN/OLE (Online Enquiry) and CAN/SND (scientific and numeric data) systems. CISTI's strategic plan reflects its commitment to develop a virtual library by introducing electronic-based services as products and services become available. In collaboration with other Council research laboratories and university partners, CISTI also undertakes research and development into innovative information systems. In 1994, the NRC STI publishing program comprising 14 peer-reviewed journals is being merged with CISTI.

The Task Force was aware that a similar agency, the National Periodical Center, was proposed but rejected in the United States at about the same time CISTI was established. [6] The acceptance of CISTI in Canada might be attributed to a perception when it was established that it would expand the universe of sources available and supplement existing library collections of STI.

To revisit the establishment of such a service within the United States, the task force considered that a number of strong collections of STI resources already exist in research libraries. The establishment of an inter-institutional agreement to provide large scale article delivery services for STI should involve libraries with strong STI collections and build upon the architecture of collaboration that already exists. Participating libraries could link together existing but geographically dispersed collections of strength to serve as a "virtual national collection" of STI resources. To function as a national, North American, or global system, the designated collections would have to be maintained in coordination with each other, be network accessible and deliverable, perform a full range of quality services, and contain their costs to keep prices charged for the services at a reasonable level.

Transforming the current system of resource sharing among independent research libraries into a national, North American, or global federation raises issues of institution-wide significance. Such a multi-institutional network of coordinated collection building will require consensus and contractual agreements among research libraries and their constituent scientific communities about certain practical matters. Which institutions, for example, will commit to maintain a national STI collection over time even if the local academic or research program changes? What is the level of service performance expected of a library that maintains a national collection? How will universities allocate resources to purchase services from such national collection(s) of STI.

To extend the concept of a distributed national collection of STI collections to one that substitutes for local resources instead of expanding them raises an additional set of issues. "Consumer libraries" need to address institutional concerns about what users require in order for remote services to function as an effective *substitute* for comparable local collections and services. Agreements need to be struck between "consumer libraries" and "provider libraries." These agreements need to assure users that fund reallocations will enhance, not diminish resources available to them. Such agreements must also assure users that network access will function as an effective substitute for local ownership. Similarly, "provider libraries" have to address institutional concerns about the impact of this additional responsibility on service to their own institutions.

Fundamentally, consumer and provider libraries and their institutions will have to craft agreements and provide support to ensure that such a federation will enhance access to STI resources. Universities would also have to be willing to embrace new assessments of institutional quality, substituting new measures for the traditional statistics reflecting size of library collections.

This inter-institutional strategy mirrors the distributed network-based program proposed by the AAU Task Force on the Acquisition and Distribution of Foreign Language and Area Studies Materials to facilitate access to publications from overseas. A similar program for STI would significantly expand access to research resources for any scientist with network access, regardless of location.

One demonstration project proposed by the AAU Task Force on the Acquisition and Distribution of Foreign Language and Area Studies Materials would develop and evaluate network access to distributed collections of STI research resources from Japan. This is the kind of demonstration project that can test the capabilities of the Modernized model, identify the characteristics that foster the Classical model, and identify the degree of centralized management required for effective operation of a distributed system. This Task Force supports this proposed demonstration project for Japanese STI resources and urges that any assessment of its progress be undertaken in the context of the findings of this report. In particular, it should specifically track how intellectual property ownership for Japanese STI affects the cost of the materials budget during the demonstration.

Whether such a distributed national library for STI could, in the long term, contain the cost of materials budgets for STI will be determined by the impact universities can have on the STI publishing marketplace, in particular the prices charged for acquiring STI research, as discussed below.

IV - Introducing Competition to the Marketplace for STI Publishing

The single most important impediment to realizing any long term cost advantages from the new models of scholarly communication is the monopoly-like nature of STI journal publishing. There is ample evidence that scientific and technical journal pricing does not reflect a competitive economic marketplace. (Selected published literature on the topic is listed in *The Landscape of STI* and *The Economics of Scholarly Communication: A Working Bibliography*, contained in the appendices to this report.)

In the recent history of scientific communication, the functions performed by publishers (editorial, validation, and distribution) have increasingly migrated into the hands of a relatively few, very large commercial publishers. In 1989, the Association of Research Libraries released a report documenting this trend and its impact on pricing and on the ability of research libraries to build collections of journals and other serials. The report recommends the introduction of greater competition to the commercial publishers. [7] The AAU STI Task Force concurs with this recommendation.

Scientists seek to publish in the most prestigious journals of their field. A common practice in the system of scientific publication is for the publisher to require the scientist author to sign over copyright as a condition of publication. The institution then repurchases the article in journal subscriptions, using funds from library and/or departmental budgets. Because of the "scarce good" nature of the scientific journal -- in particular, the prestigious titles in each discipline -- there is no market substitute; publishers can and do charge extraordinarily high prices for these subscriptions, and the increase has been in considerable excess of inflation. As the copyright is assigned to the publisher the profit returns to the publisher, not to the scientist author or to the institution that may have supported the research. And the control for the duration of copyright belongs to the publisher.

In the last twenty years, librarians have allocated more funds to publishers of STI journals to cover price increases, not to acquire additional titles. Figure 3, a chart of monograph and serial costs in ARL libraries, illustrates that increasing expenditures for serials have resulted in fewer books and journals being acquired. In AAU universities, it is not uncommon for a research library to spend two-thirds of its serials budget for science journals -- journals that are priced largely in a monopoly-like marketplace. All AAU universities would benefit from a more competitive marketplace for STI publications. That is a marketplace where prices for journals are determined more by the actual cost of production instead of by a monopoly-like marketplace. To create such a marketplace, there is a need for a greater mix of commercial and not-for-profit organizations engaged in electronic publishing of the results of scientific research.

A. University Support for STI Electronic Publishing

The key university strategy to contain the costs of managing STI is to introduce competition into the marketplace for STI by encouraging not-for-profit organizations to engage in electronic publishing of scientific research results. A more competitive marketplace requires that established and new not-for-profit organizations enter STI electronic publishing. These organizations could include research libraries, university presses, scientific societies and partnerships among these and similar organizations. Partnerships between universities and scientific societies should be explored as these institutions share many of the same objectives in knowledge creation, quality control, and dissemination at low cost.

By definition, not-for-profit organizations have an economic structure that makes them accountable to the organizations' membership or to the general public to operate on cost-based terms. This is an important characteristic when determining actual costs for a publication and for recognizing cross subsidies that may occur, for example, when a publisher starts a new journal. This is the kind of an assessment difficult to surmise from commercial publishing organizations.

The Task Force is aware of significant difficulties that not-for-profit publishers face when trying to compete with the for-profit sector. However, the Task Force sees an opportunity and a compelling self interest for universities to act to build and support a not-for-profit STI publishing base for the future -- a base essential to receive new STI intellectual property that might otherwise be assigned to commercial publishers perhaps because not-for-profit publishers did not exist.

Some not-for-profit professional societies (e.g. American Phytopathological Society, American Society for Microbiology) are moving towards electronic publication of print-based journals to contain costs. The combination of improved technology for mathematical (graphs, tables) and photographic (including electron micrographs) transmission, increased postage and increased paper costs are compelling. A transition period is likely in which both paper and electronic formats are available. (See also *The Landscape of STI*, in Appendix A, for examples of other professional society publishing programs.)

Electronic publishing of the results of scientific research is not an insignificant burden to ask universities or other not-for-profit organizations to assume. In some cases, the Task Force recognizes that additional financial support for such organizations is required to make this concept a reality. However, creation of competitive outlets for publishing STI remains the single most important action with potential for a long term solution to contain the costs associated with managing STI.

University leadership and financial support is required to build a cost-based niche in the STI marketplace to foster competition so that publishers of high-priced STI journals moderate their subscription prices.

B. University Actions re STI Intellectual Property

The current practice by scientists of assigning total intellectual property ownership to STI publishers is a barrier to achieving university cost containment for library materials budgets. To maintain and expand access to STI research resources while containing university costs, the task force sees advantages to develop university policies, practices, and mechanisms to retain in the not-for-profit sector some or all of the ownership rights of the intellectual property that is created by university faculty and staff. (For a description of possible ownership scenarios, see the Report of the AAU Task Force on Intellectual Property Rights in an Electronic Environment, especially part 5, *Four scenarios for change,* and part 6, *Corollary issues for further deliberation.*)

The National Science Foundation estimates that 36% of all scientific papers published in journals are written by U.S. authors (30% for physics journals). [8] There are no precise data to indicate what portion of those U.S. authors are university-based, but informed estimates suggest that about two thirds of U.S. scientific authors are based in academe. University actions to encourage or require these academy-based authors of scientific articles to retain intellectual property ownership in academe would channel intellectual property to the not-for-profit outlets that are needed to make the marketplace for STI more competitive.

A fundamental concept underlying the scientific communication process was lost during the commercialization of the scientific journal. That concept is the importance of the university community as a supplier of scientific knowledge. This knowledge has too great a value for achieving national and global educational and research agendas for its ownership and control to be relinquished to enterprises with different goals.

C. University Acceptance of STI Electronic Publications

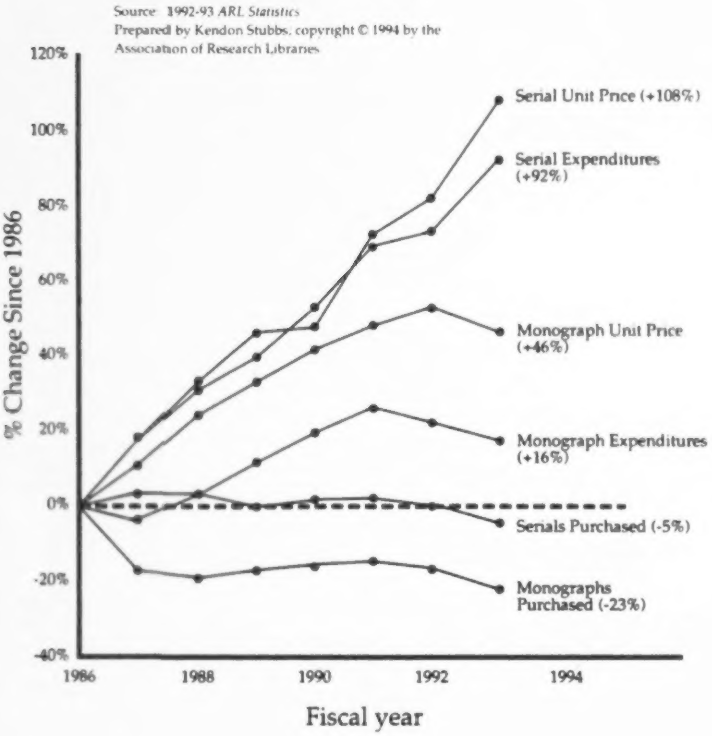
University reward and recognition systems must embrace electronic publishing as a legitimate outlet for publication of research results. A strategy that promotes non-profit ownership and cost-based *electronic* distribution of scientific articles authored by the faculty of North American universities would enhance access to these writings in all non-profit settings. For this strategy to contain costs in a significant way, it must be developed as a viable alternative to publication in paper journals. It must also result in journals that can compete in terms of academic legitimacy and editorial quality with traditional paper journals.

At present, the promotion and tenure process for faculty in most research universities recognizes primarily the Classical model: untenured faculty need to publish their research in the most prestigious journals. Electronic journals need to be made as prestigious as classical ones if the Modernized and Emergent models are to succeed. This is a function of the editorial boards and editing process, not of the format of the journal.

To achieve the transformation of STI management, it is critical that university reward and recognition systems embrace electronic media as a legitimate outlet for publication of research results, and that institutions develop strategies to encourage electronic journals to achieve as high a level of editorial quality and prestige as is now assigned to paper journals.

Figure 3

Monograph and Serial Costs in ARL Libraries, 1986-1993



Source: 1992-93 *ARL Statistics*
Prepared by Kendon Stubbs, copyright © 1994 by the Association of Research Libraries

V - A Role for the U.S. Government

The U.S. Government invests nearly $70 billion annually to support scientific and technical research. To use much of the results of this publicly funded research, scientists (or the libraries that support them) should not be required to pay prices set by commercial publishers at rates much higher than cost.[9]

To introduce more competition to the marketplace for STI and speed the dilution of the current monopoly-like nature of commercial journals as outlets for scientific and technical articles, the Task Force recommends that the U.S. Government assume a role in the transfer of publicly funded STI research results to not-for-profit channels. This would leverage the science agencies' investment of $70 billion by ensuring that subsequent research is less costly. It would make a significant contribution to a national strategy for managing STI, and will reduce the cost of access to STI for those government agencies that purchase scientific journals for their own use.

Agencies of the U.S. Government that fund scientific research should, as a condition of funding, require that a copy of any report, data sets, or articles developed as a result of publicly-funded work, be deposited into an electronic outlet that will provide public access. The concept does not prevent an author from simultaneously submitting the reports, articles, or data sets for traditional publication or electronic dissemination elsewhere. All that is required, assuming public funding, is to deposit a copy in a repository that offers public retrieval services at cost-based prices.

Proposed National Repositories

To carry out this proposal, the Task Force envisions a system of distributed national repositories to manage all of the functions traditionally performed by the paper journal for scientific articles written as a result of publicly funded research. The scope of these repositories might be defined by discipline or line of scientific inquiry, or perhaps by source of funding. The repository would be an electronic database that could be managed by a scientific society, library, university press, government agency, or any organization that shares the goals of the research and education community.

The research funding agency would designate one or more these national STI repositories as the point for registering a copy of the article, report, or data set.

Each repository would have two components: a Current Collection and one or more Permanent Collections. Both parts are network accessible electronic databases. The Current Collection contains reports in preprint form as in the Los Alamos electronic preprint distribution system for particle physics. (One difference is that the Los Alamos system is completely voluntary. Authors choose to submit their work to the system; there is no requirement.)

The Permanent Collection replicates functions now performed by the paper journal. Entry into a Permanent Collection requires peer review to validate the research. Any article or report adopted into a Permanent Collection will, as the name suggests, be archived permanently. To guard against the impermanence of organizations, contractual conditions that specify conditions for the transfer of a Permanent Collection may be necessary.

Submission of an article to a Current Collection repository does not affect an author's freedom to submit the same work to other electronic bulletin boards that may exist, and to submit it to another publication channel, such as a paper or electronic journal. If such a journal demands *exclusive* publication rights, then the author may request that the peer review process for the

Permanent Collection be bypassed. In such a case, the work will reside in the Current Collection for two years and then be deleted, without ever being considered for inclusion in the Permanent Collection. But in no case (assuming some fraction of federal funding) can the author choose not to have the work be available in the Current Collection as a preprint.

Both Current and Permanent Collections will be made available at a reasonable cost to the scientific community for browsing, searching and document retrieval. Such availability may or may not be mediated by the library system in the user's institution.

As the nascent form of the majority of scientific documents is electronic, this proposal need not be a significant burden on authors. The goal is to allow the rapid dissemination of articles via cost-based channels, building national collections of digitized STI resources and lowering the costs for access and use.

The success of the proposal should be reflected in a reduction in the number of paper STI journals and in more competitive pricing for STI journals and article delivery services.

VI - Implications for Research Libraries and their Institutions

The Task Force findings have significant implications for the entire university, not just the research library. All participants in the system of scientific communication will be affected as the system is transformed. At issue is the customary manner by which scientific research and discovery are conducted and supported and through which the results are shared with current and future scientists and students.

The Project Steering Committee asked the AAU Task Forces for recommendations to assist universities to achieve a greater return from their current level of investments made in the collection and distribution of research collections. This Task Force concurs with the Steering Committee's interim assessment that the issues under scrutiny can no longer be addressed as "business as usual." Actions should be taken to encourage campus constituencies to recognize the benefit of change -- change in the library and elsewhere on campus -- in order that scholarly access to research resources may be provided at costs that are sustainable.

Short and long term strategies are necessary to effect change in long-standing university practices and commonly held assumptions and values. The recommendations presented in section I of this report are proposed next steps for AAU and its member universities. It should be understood however that these actions are intended only as the next steps in a strategic direction that will, in the long term, exert a positive influence over the transformation of scientific communication.

VII - Opportunities for the University Beyond the Sciences

There is extraordinary potential in the current electronic environment for innovation and discovery of new methods of scientific inquiry and for improvement in the management of STI. Indeed, the opportunities for the university as a whole surpass those for the sciences. Institutional and library actions that take full advantage of networks, networked information, and creative applications of information technology are strategic investments that

- Recognize the changing nature of scholarly research and communication and its reliance on networks and new technologies,
- Support research and teaching in *all* disciplines,
- Enable libraries to improve their services for STI and other research resources as well, and
- Provide universities with a capacity to pursue distance learning, independent education, worldwide education, and industry/education collaboration.

The challenge for universities and libraries -- individually and collectively -- is to achieve a level of readiness that will maximize the potential of such applications in support of science *and* to leverage this investment for the benefit of the institution as a whole.

Endnotes:

1. See Shirley K. Baker and Mary E. Jackson, *Maximizing Access, Minimizing Cost: A First Step Toward the Information Access Future,* prepared for the ARL Committee on Access to Information, (Washington, DC: Association of Research Libraries, February 1993); and Marilyn M. Roche, *ARL/RLG Interlibrary Loan Cost Study,* (Washington, DC: Association of Research Libraries, June 1993).

2. National Research Council. *National Collaboratories: Applying Information Technology for Scientific Research.* (Washington DC: National Academy Press, 1993), 7.

3. Efrat Livny, "Introduction: Human and Plant Genome Projects." *Bulletin of the Medical Library Association* 81 (July 1993), 273.

4. C. R.. Clauser et.al., "The Upper Atmospheric Research Collaboratory: A Testbed for Electronically Supported Collaboration." *Transactions of the American Geophysical Union,* in press.

5. National Research Council, 7.

6. Mary Biggs, "The Proposed National Periodicals Center, 1973-1980: study, dissension, and retreat," *Resource Sharing and Information Networks,* Spring-Summer 1984.

7. *Report of the ARL Serials Prices Project* (Washington, DC: Association of Research Libraries, May 1989).

8. *International Science and Technology Update* (NSF 91-309) (Washington DC: National Science Foundation, 1991).

9. A U. S. Government information policy that addresses the issue of cost for access to and use of publicly funded scientific research is "Data Management for Global Change Research Policy Statements," July 1991 [published in *The U.S. Global Change Data and Information Management Plan*, A Report by the Committee on Earth and Environmental Sciences, National Science Foundation, Washington, DC, 1992, pp. 43-48].

Appendix A

THE LANDSCAPE OF STI

Note: This paper provides a sampling of technology-based activities in STI as of March 1994. It is not a complete survey of projects and initiatives.

ELECTRONIC STI PUBLISHING

ELECTRONIC JOURNALS

There are over seventy peer-reviewed electronic journals, according to the latest edition of the ARL OSAP *Directory of Electronic Journals, Newsletters and Academic Discussion Lists* (in press). A minority are in scientific or technical fields. *Psycoloquy*, which began in 1990, was the first refereed journal with rigorous peer-reviewing standards. The *Bulletin of the American Mathematical Society* was one of the first journals on the Internet to display mathematical formulae.

The MIT Press and the MIT Libraries have announced the publication of the *Chicago Journal of Theoretical Computer Science*, which represents a new relationship between publishers and libraries to meet "the scholar's desire for quicker peer review and dissemination of research results, the library's need to develop systems and structures to deal with electronic journals...[and] the publisher's need to develop an economic and a user model for electronic dissemination of scholarly journals."

ELECTRONIC PREPRINT SERVICES

Preprint distribution has traditionally served the important function in the sciences of rapid distribution of scientific papers. Preprints are often the main way that some information reaches its primary audience. Electronic preprint services have begun to replace the traditional system of distribution through the mail. The electronic services facilitate quick access by a wide audience.

A well-known electronic preprint service in the sciences is HEP-TH. Begun in 1991, HEP-TH is a electronic preprint archive and distribution service in the field of theoretical physics. Researchers submit electronic versions of preprints which are then stored indefinitely. Users can scan a list of preprints available, read the abstract, and request an electronic copy. In early 1993, the system had over 2000 users. Preprint bulletin boards in over a dozen other subdisciplines of physics have been established. There is also preprint activity in a number of other disciplines, including mathematics, computer science, history and philosophy.

PROFESSIONAL SOCIETY PLANS

In 1989, the National Science Foundation funded the American Mathematical Society (AMS) to develop an electronic service for mathematicians and a prototype electronic journal. The service, e-math, provides access to publications, software, preprints, and discussion lists. The *Bulletin of the AMS* , on the Internet since 1992, displays non-textual material such as mathematical equations and formulae.

NASA, the American Astronomical Society and the University of Chicago Press collaborated on a multi-year project, STELAR. Several astronomy journals were converted to page images and made available in prototype form. The AAS and the University of Chicago Press are now developing a platform to make the AAS journals available electronically.

The American Physical Society has three electronic publishing projects underway. They are (1) making past volumes of the *Physical Review* available over a Wide Area Information Server in collaboration with the Los Alamos National Laboratory; (2) scanning *Physical Review Letters* and *Physical Review E* and storing them on optical disks, in cooperation with the Naval Research Laboratory Library; and (3) soliciting proposals to create an on-line version of *Physical Review Letters*, to be published along with the printed version.

The Association for Computing Machinery (ACM) contracted in 1993 with OCLC to develop an electronic publishing system. The in-house electronic publishing system will integrate ACM publishing functions into an automated system that will encompass writing, editing, composition, production, archiving and eventually distribution of over 40,000 pages per year. The system will be completed in 12 to 18 months.

The American Chemical Society plans to expand its Chemical Journals Online(CJO) Project. CJO is currently a text-only database which includes 57 journals. ACS plans to add figures, tables, photos and formulas to the database.

OTHER TECHNOLOGY-BASED PROJECTS

TULIP

TULIP (The University Licensing Program) is a project developed by Elsevier in conjunction with nine research libraries to test systems for networked delivery and use of journals. Bit-mapped journal pages from 43 Elsevier and Pergamon materials science journals are delivered via the Internet and made available over local campus networks. Full implementation of the project at all nine sites is expected during 1994-1995. The University of Michigan was the first site up and running. University implementation varies at each site, with some approaches focusing on search capabilities, while others stress the browsing function. TULIP is conceptualized as an experiment, a learning experience that will inform future electronic distribution ventures.

RED SAGE

The University of California and AT&T Bell Laboratories are collaborating with several publishers on the Red Sage project to explore issues surrounding scientific communication in a networked environment. Its objective is to make journals in molecular biology and radiology available over the university's campus network, in a way that makes the computerized version as similar as possible to the print format. The "RightPages" software developed by Bell Labs displays both text and image files. The project will examine issues beyond the technical factors, including the economics of electronic journals.

CORE

The Chemistry Online Retrieval Experiment Project (CORE) is a collaborative effort by the American Chemical Society, Bellcore, the Chemical Abstracts Services, the Cornell Mann Library, and OCLC. It will create an electronic database of chemistry literature and a system to deliver it to desktop computers. CORE will provide ten-years of full-text of 20 American Chemical Society Journals, as well as selected monographs from Springer -Verlag. Multiple interfaces to the database, including hypertext links, are being developed to permit a variety of ways to display, search and navigate the material.

UPPER ATMOSPHERIC RESEARCH COLLABORATORY (UARC)

This five year project supported by the NSF is investigating the creation and application of an emergent "collaboratory" model to support distributed collaborative science in ways that reduce barriers of both time and distance. Participants are the University of Michigan, SRI International, the University of Maryland, Lockheed Palo Alto Research Center, and the Danish Meteorological Institute. Scientists, students, and staff, by way of Internet, can now conduct real-time experimental campaigns using a suite of observational instruments located in Greenland. Data streams, graphical representations, commentary, and annotations of the group are captured and available for later replay, refinement, editing, and inclusion in an integrated-media electronic journal.

LARGE-SCALE INITIATIVES

HUMAN GENOME INITIATIVE

The Human Genome Initiative was the first full-scale effort to apply the principles of "Knowledge Management," the involvement of librarians and information managers at all stages of a project in order to collect, organize, manage and provide access to the massive archives of data being generated. The Human Genome Initiative, which comprises the Human and Plant Genome Projects, is an ambitious fifteen-year effort that seeks to decipher the complete genetic code of the human genome. Funded by several U.S. government agencies, the initiative involves the disciplines of chemistry, biology, physics, mathematics, engineering, computer science and information science. It is an international collaboratory project with an estimated budget of $200 million a year.

DIGITAL LIBRARY INITIATIVE

In the fall of 1993, the National Science Foundation announced a joint initiative with the Advanced Research Projects Agency to fund programs of research, development and testing of elements of a digital library on a significant scale in a distributed environment. The NSF considers information accessed via the Internet to be the ingredients of a digital library, and programs funded under the initiative will explore not only aspects of connectivity but how to achieve digitization of large amounts of information in an economically feasible manner, and how to store, search process and retrieve information in a user friendly way. Awards of up to $1.2 million per year for up to four years will be made in the areas of: electronic data capture, categorization and organization; development of intelligent software for browsing, searching, filtering and related functions; and utilization of networked databases throughout the nation and the world. Nearly 80 proposals were submitted to NSF, awards will be announced in the summer of 1994.

GLOBAL CHANGE INITIATIVE

The US Global Change Research Program is part of the worldwide Global Change Initiative, which seeks to observe, understand and predict global change. A fundamental part of the Initiative is data and information gathering in order to conduct research, develop a model of global change, and make assessments. The initiative is noteworthy because it is formulated on the principle of science-driven data management, carried out by researchers and other users working together with data managers from start to finish. The USGCRP is a multi-agency project and its information and data aspects are handled by the US Global Change Data and Information System. The system is designed to enable a diverse user community to learn what data and information are available, have key material available in easily accessible forms, and be assured of its quality and continued availability.

ECONOMICS OF STI

Several studies of the economics of scholarly communication have been issued in the last five years. Economic Consulting Services' *Study of Trends in Average Prices and Costs of Certain Serials Over Time,* a consultant report prepared in 1989 as a part of the ARL Serials Prices Project, includes discipline-specific price trends.

In its 1990 report to the National Science Foundation, *Communications in Support of Science and Engineering,* , the Council on Library Resources published a study on the correlation between library resources and scientific productivity. The study, "Library Resources and Research Productivity in Science and Engineering," was conducted by Nancy Van House. It found that there is a correlation between scientific and engineering library resources and scholarly productivity, as measured by publications and faculty honors. The study raised questions about the effect of declining library purchasing power on scientific productivity. In a continuing effort to explore the economics of scholarly communication, the Council has recently funded an investigation into the economics of networked information to be conducted by Paul Peters of CNI and Richard West of California State University.

A special issue of *Serials Review,* (Volume 18 #1-2), "Economic Models for Networked Information", included several papers on STI. Richard Katz's article, "Academic Information Management at the Crossroads," is a particularly useful discussion of the need for a "thorough study of both the macro- and microeconomics of creating, publishing, distributing and managing publication quality academic information."

University Libraries and Scholarly Communication, published in 1992 by ARL for the Mellon Foundation, includes an analysis of book and serials prices by field. In the spring of 1994, the Mellon Foundation issued a discussion paper, "Scholarly Communication, Academic Libraries, and Technology," which outlines the Foundation's priorities for project funding. The Foundation intends to begin by funding projects in the area of journal publication, such as the economics of publishing and scholarly communication, and alternative approaches to the publishing/delivery/storage/retrieval aspects of journals.

See also *Economics of Scholarly Communication: A Working Bibliography,* included as Appendix D to the Task Force report.

Prepared by Diane Harvey, ARL, for the AAU Task Force, March 1994.

Appendix B

THE SYSTEM OF SCIENTIFIC AND SCHOLARLY COMMUNICATION: Functions, Performance Attributes, System Participants

FUNCTIONS

INFORMATION GENERATION AND CREATION
Includes data collection and analysis/synthesis.

AUTHORING
Writing, revising and improving.

INFORMAL PEER COMMUNICATION
Access by peers, distribution of preprints etc.

EDITORIAL AND VALIDATION
Editing processes, peer review (quality control), market assessment by publishers and editors (identification of unmet needs, what else exists, what needs to be published).

OWNERSHIP, PRIVACY AND SECURITY
Copyright issues, policy issues i.e. confidentiality, guaranteeing the authenticity and authority of text.

DISTRIBUTION
Making copies after the first copy available on a wholesale basis .

ACQUISITION AND ACCESS
Includes personal and institutional purchase; includes access and ownership. Includes the decision to acquire, or decision not to purchase and to rely on access.

STORAGE
Holding and making available (the "place" dimension).

PRESERVATION AND ARCHIVING
Includes decision to archive and preservation (conservation) functions (the "time" dimension). Includes assuring the security of the item in storage (e.g. in stacks or archived on network).

INFORMATION MANAGEMENT
The processes of identifying, describing and structuring the item in order to facilitate "discovery." Includes processes such as bibliographic control.

LOCATION AND DELIVERY
Identification of sources of information and obtaining the information. Includes reference and training.

RECOGNITION
Institutional rewards and recognition.
DIFFUSION
Access to those outside author's primary community.

UTILIZATION OF INFORMATION
By user

PERFORMANCE ATTRIBUTES

EASE OF USE

How easily and effectively does the system make information accessible to known users and potential users?

TIMELINESS

How long does it take for the information to become available?

RESPONSIVENESS

How quickly can needed information be identified and accessed?

ACCURACY

How error-free is the information at each stage in its life cycle (through mechanical or system transmission)?

AUTHENTICITY

How much does the information get distorted or changed as it moves through the system (through human processes)?

PREDICTABILITY

How reliable and consistent is the system in maintaining levels of quality and availability?

ADAPTABILITY

How flexible is the system in providing new approaches to information or providing access for unanticipated users?

RELEVANCE

How well does the system provide mechanisms such as filtering and assessment of information?

ELIGIBILITY

Who has access to information in the system?

COST

What are the system and unit costs, and to whom?

RECOVERY

How well is the system able to avert or recover from error (caused by mismanagement or lack of resources to make the system work)?

INNOVATION

How well does the system perform research and development to provide system innovation?

EXTENSABILITY

How well does the system integrate between media? Between disciplines? What is the system's ability to build and extend itself without a total restructuring?

SYSTEM PARTICIPANTS

NOTE: THESE CATEGORIES ARE NOT MUTUALLY EXCLUSIVE; THEY ARE A MIX OF INDIVIDUAL AND INSTITUTIONAL PLAYERS WITH SIGNIFICANT OVERLAP.

CREATORS

COPYRIGHT OWNERS

SCIENTIFIC SOCIETIES

ABSTRACTING & INDEXING SERVICES

PUBLISHERS

VENDORS, JOBBERS AND OTHER WHOLESALERS

UNIVERSITIES

UNIVERSITY LIBRARIES

UNIVERSITY COMPUTER CENTERS

GOVERNMENT AGENCIES (FEDERAL AND STATE)

INDUSTRY

NON-PROFIT ORGANIZATIONS

USERS (SCIENTISTS, ENGINEERS, OTHER PROFESSIONALS, ETC.)

Appendix C

MODELS OF SCIENTIFIC AND SCHOLARLY COMMUNICATION

In order to evaluate different options for managing STI, the Task Force developed an analytical framework (Appendix B) that describes the system of scientific and scholarly communication. The analytical framework identifies system functions, performance attributes, and system participants.

Using the components of the communication system identified in the framework, three models of information creation, dissemination, and use -- Classical, Modernized, and Emergent -- were formulated and assessed. The following is a description of each model, along with the Task Force's assessment of how each model performs the functions of scientific and scholarly communication.

The term "model" as used in these formulations is not used in a predictive or prescriptive sense. The models are, rather, intended as descriptive representations of various ways that scholarly and scientific communication operate now and could operate in the future.

THE CLASSICAL MODEL

The print-based traditional scientific scholarly communication model is exemplified by the scholarly journal. The print journal remains, for most fields, a primary model of scientific and technical communication. It is estimated that there are over 20,000 scientific and technical journals worldwide. Current institutional support for STI has been predicated on this model.

- The scientific journal, as the primary method of print-based communication, supports the ***authoring*** function well in the areas of eligibility, accuracy, and integrity. It fares less well in adaptability from the author's perspective, since the format for journal articles is fairly rigid. In the traditional journal system, authoring functions are performed by individual scientists or groups of scientists, with costs absorbed by the author's institution.

- As a means of ***informal peer communication***, the print journal is particularly poor in serving the performance attributes of, for example, timeliness, responsiveness, and adaptability. Distribution of preprints by authors and presentation of conference papers are means of overcoming this disadvantage.

- ***Editorial and validation*** processes as performed by journal publishers and peer reviewers, however, work in a fair to good manner, especially in providing accuracy, integrity and relevance. Timeliness is the attribute performed least well by this function. The peer review system is an established strength of the print-based system. Editorial and validation costs are borne by publishers and by the institutions which employ the editors and reviewers.

- Functions related to ***ownership, privacy and security***, such as copyright, are well served by the traditional journal. The fixed nature of the print journal, which provides such positive attributes as integrity, accuracy and predictability has a downside, which is a lack of adaptability in providing new approaches to information. As confidential materials are not published in most scientific journals, the functions of privacy and security of STI are not invoked.

- Performance of ***distribution*** functions varies from good (providing ease of use and integrity) to poor (problems with timeliness, responsiveness and adaptability). The time lag in journal publication is particularly problematic, as is the inability of print journals to provide flexible approaches to information. Distribution is performed by publishers, vendors and subscription agents.

- ***Acquisition and access***, from the personal and institutional perspective, function well in assuring predictability, integrity and relevance. They perform less well from the perspective of ease of use, timeliness, responsiveness and eligibility. Both distribution and acquisition/access discriminate in favor of ability to pay and thus negatively impact eligibility and responsiveness; although institutional access (for example, by libraries or academic departments) increases equity of access.

- ***Preservation and archiving*** of print materials varies depending on the type of material. The printed journal is well managed in terms of preservation and archiving compared to other kinds of scientific information. The attributes most important to preservation-- integrity, accuracy and predictability-- are well served. Preservation and archiving are enabled by institutional investment in library buildings, collections, and services. The methods of preservation and archiving vary and may involve reformatting from paper to film or magnetic media. The method chosen, especially if it includes reformatting, will impact (positively or negatively) on attributes such as ease of use and timeliness.

- ***Storage*** of print-based materials has traditionally been the purview of the library. Institutional investment in building and maintaining library facilities is the major aspect of storage cost. Since storage arrangements are made on a distributed basis, performance of such attributes as ease of use, timeliness and adaptability can vary. Predictability and integrity are usually good, depending on security measures taken by an institution.

- From an ***information management*** perspective,which encompasses identifying, describing and structuring the information base, the print-based system performs in a fair to good manner. Costs to support these functions are borne by the institution, directly in the case of investment in institutional structures, and indirectly in the case of (for example) subscriptions to indexes. The current institutional support for libraries has developed in response to print-based information resources. Universities, colleges, governments at all levels, and corporations have invested in library buildings, collections and services to manage STI. Commercial investment in development of secondary information sources such as indexes and bibliographic tools, have contributed to the library's ability to manage print-based resources. The information management function performs best in responsiveness, predictability, accuracy, integrity and relevance, while functioning less well in the areas of ease of use and timeliness.

- ***Location and delivery*** functions perform in a good manner in the areas of accuracy and integrity. Eligibility is performed in a fair to good manner, while other attributes such as timeliness, and adaptability are not well served by the print journal system .Investment by libraries in systems which reflect materials holdings and agreements which enable cooperation are the foundation for location and delivery of the print journal. Delivery through conventional interlibrary loan is being supplemented by new forms of document delivery, which may improve location and delivery functions.

- The print-based scholarly journal serves the function of ***recognition*** well. Institutional policies on tenure and promotion are based in part on quality judgements that look at the number of articles published and in what journals.

- The print journal provides a primary means of information ***diffusion***, making articles accessible to audiences beyond the author's primary audience. It performs this function in a way that is easy to use and accurate while maintaining integrity and eligibility. It performs less well in the areas of responsiveness, adaptability and cost. Relevance varies depending on performance of the information management function.

- Print-based information serves the ***utilization*** function well in the areas of ease of use, predictability, integrity and eligibility. The stable format of print journals and their availability through libraries or individual subscription foster utilization. However, print-based materials perform less well in timeliness, responsiveness, adaptability and relevance. Utilization depends on investment in acquisition, access and information management by individuals and institutions; and on services provided for interlibrary loan/document delivery from remote collections. Delivery of print information in electronic format may enable improved utilization.

THE MODERNIZED MODEL

The model implicit in the Task Force charge describes a distributed (as opposed to a centralized) system of STI collection and dissemination which would coordinate an unspecified number of regional libraries to provide national-scale information services. The modernized model described here is neutral on the issue of centralized versus decentralized collections and services. Such a judgement is best addressed through an assessment of performance attributes including cost.

The modernized model focuses first on what can be termed the "post-press" processes, that is, the functions after distribution of an article or a journal. The modernized model is to a great extent the contemporary model, in that most aspects are available today.

In the modernized model, which can also be called the "document or article delivery", "on-demand" or "just in time" model, information is still largely published and resides primarily in paper form, but there is an array of expanding options for discovery and delivery. At the same time, the modernized model can also accommodate emerging electronic journals that are authored, published, and stored in electronic form.

The modernized model can have three manifestations. In the first, referred to as Modernized A, system inputs (from author to publisher) can be in paper or electronic form, access to information can be through paper (such as print indexes or abstracts) or electronic (online databases) means, but information output is still primarily delivered to the user in paper form (by mail or fax from a commercial document delivery service, for example). In the second variation (Modernized B), information inputs and access remain the same as in Modernized A, but information output can be delivered to the user either in paper or electronic form because of a higher degree of institutional infrastructure readiness. Modernized C, which presumes a major change in university policies on intellectual property (e.g. non-profit retention of some or all rights to the articles created by university faculty and staff), as well as a high degree of infrastructure readiness in terms of network capability, enables information inputs, access and delivery to be primarily in electronic form.

Examples of the modernized model can range from commercial document delivery services such as CARL Uncover, to innovative projects such as Elsevier's TULIP project or the Red Sage cooperative project between the University of California at San Francisco, Springer Verlag and AT&T Bell Laboratories. All these modernized access and delivery services impact the STI management functions *after* initial publication, and some are planning to broaden their impacts to the functions before publication.

- **Informal peer communication** is facilitated in this system since preprints are available electronically. Ease of use, timeliness and responsiveness are enhanced, while eligibility may be limited. Costs are network based and borne by the institution mounting the preprint system and by the user's institution. In developing the electronic preprint system, authors have modernized in advance of publishers.

- Because authors and editors can now communicate electronically, performance of **editorial and validation** functions are enhanced. Timeliness and adaptability are performed particularly well by an electronic system of communication between author and publisher.

- As this system is still largely based on print products, **ownership, privacy and security** issues raised in the traditional print journal system still apply. Commercial document delivery services provide a mechanism for automatic collecting of copyright fee payment, but may make it administratively inconvenient or impossible to exercise fair use rights. In Modernized B, where the information delivered to user may be in electronic form, questions of copyright and of text authenticity may be raised. In Modernized C, changes in university policy in regard to ownership of intellectual property could result in wider availability of material as well as significant cost savings.

- In the modernized system, when intermediary agents such as commercial document delivery services are used, articles are the primary unit of **distribution** in contrast to the traditional print-based system where journals were the unit of distribution. "Publication" may occur without the generation of paper copy, as in electronic journals. Electronic distribution could enhance timeliness, ease of use, and responsiveness of distribution mechanisms. In Modernized C, institutions may become distributors, and may assume editorial and validation functions.

- The major impact of this model occurs in functions after distribution, such as **acquisition and access**. There are more options for fulfilling the functions of acquisition and access beyond acquiring/loaning/borrowing a paper copy. A greater variety of channels exist for acquisition, either in paper or electronic format. Acquisition and access costs may shift from traditional library acquisition budgets to budget lines that support commercial document delivery or network-based services. Acquisition and access functions and budgetary support in this model may or may not be centralized in the library -- an individual or academic department may also support them.

- **Storage** of information could be significantly affected. For materials reliably available via other sources, storage would no longer be required by local institutions. Document delivery, either through the library or directly to the user, would put "non-returnable" information into the hands of the user so that the library would in many cases not retain a copy of the item. For these reasons, storage space required for individual institutions may not continue to expand at present rates. Digitization of items already in the library, and an increase in electronic outputs could further shift storage costs from shelving to computer storage capability.

- **Preservation and archiving** is also significantly affected in the modernized model. These functions also take on increased importance if the storage sites for information delivery are reduced. The emergence of electronic formats requires development and adoption of guidelines for ensuring the integrity, accuracy and predictability of electronically stored text and graphics. Institutional archiving and preservation costs in facilities, reformatting processes and services will be affected by two trends: the speed by which the initial STI output is distributed in electronic instead of paper format; and the extent to which remote document delivery substitutes for locally held collections.

- **Information management** processes which aid identification are crucial to a system which depends on the ability of a user to "discover" an item that may not be available locally. An "on demand" system requires exemplary information description and identification. Information management costs may decrease in modernized systems. With increased online availability of full text, sophisticated search and retrieval mechanisms can replace traditional descriptive cataloging. Moving from bibliographic description of individual items through cataloging, to a process of assembling and linking records and databases and connecting them to location and delivery information, may reduce the labor intensity of the bibliographic control process as it becomes more automatic.

- **Location and delivery** are key functions in the modernized model. The success of document delivery rests on knowing what is available, where it is available, and how to obtain it. The location and delivery function encompasses reference and consulting to users, and training to maximize use of the system, as well as the communication of an information request and the delivery of needed items. Eligibility for all campus users is a key attribute for delivery of remote information to substitute for local ownership. Traditional interlibrary lending for copies of articles or other "nonreturnable" items,is not employed in this model. Instead, article delivery in the modernized model is through a variety of paper and electronic means: mail or fax delivery of a paper item ordered through an online database, full text CD ROM products, or through the network. This model shifts from the "just in case" system of library acquisitions to the "just in time" article delivery mode; it follows that costs will shift from library storage to location and delivery functions such as commercial document delivery fees or network costs.

- Wider options for **utilization** of information would be provided by new varieties of electronic outputs such as searchable electronic text. There would be new costs for utilization because of investment in desktop capabilities and in equipment such as faxes, printers and scanners.

THE EMERGENT MODEL

This model accounts for the use of computing and communications technologies to share instrumentation, primary data, and software tools as well as to share information per se. It also accounts for the use of these technologies for genuinely innovative purposes, such as for interactive, multi-media information environments, rather than for the modernization of page formatted information from paper to network storage and access media. It views each scientific community as a knowledge management system, and it calls upon scientists, information technologists, and librarians to act as partners in all components and activities of that system. Information environments generated by this model are referred to as "collaboratories." Early examples of such environments can be found in the human genome and global climate change communities.

- **Information generation and creation** is a major feature of this model, particularly so in comparison to the other two models. The digital technologies that operate the instruments of scientific research and discovery are more and more the same as those that support the channels of scientific communication and publication. And, information generation and creation in science no longer has to be the solitary, private affair that it once was. Perspectives and skills historically associated with other information management functions are now needed in the process of information generation and creation.

- The major change evidenced by the **authoring** function in this model is the increase in the number of authors associated with a given work. This increase reflects both the "big science" character of contemporary scientific research and the expanded number of collegial relationships scientists are able to establish and maintain using electronic mail and other networked communication facilities and techniques.

- In this model the difference between **information peer communication** and **authoring** is difficult to sort out in the abstract. Informal peer communication between scientists along the edge of a given research front serves many of the purposes of "authoring" for those same scientists in other models. In addition, many formal, authored communications originate in informal peer communication processes that do not anticipate their eventual end-state. Existing principles and codes of scientific behavior regarding formal communication must be updated and translated to yield principles and codes of scientific behavior regarding informal peer communication and its relationship to formal, authored communication.

- This model incorporates and extends the **editorial and validation** function of the other models to assess and control the quality of primary research data as well as of findings reported via formal channels of scientific communication and publication. It also supplements formal editorial and validation mechanisms, such as editors and reviewers, with informal ones, such as conversations in networked discussion forums about pre-prints, works-in-process, recently published works, and so forth.

- This model addresses a number of unique **ownership, privacy, and security** issues and, in the main, these issues arise from (1) the fact that the model embraces primary research data as well as findings reported via formal channels of scientific communication and publication, and (2) the fact that it supports scientific communities that are highly collaborative. This model does not break new ground with respect to the other two models as regards copyright management in electronic versus print media. It does frame intellectual property issues in completely electronic environments by noting that what constitutes intellectual property in these environments is a difficult question to answer, as are questions of how to apportion and protect ownership to and of that property. This model also raises new issues regarding the privacy of research subjects and sites because the identities of these subjects and the locations of these sites can be inferred much more readily and widely from primary research data than they can from published findings. Finally, security is a heightened concern in this model because the negative effects of corrupted or altered primary research data are much more damaging to science as a whole than is the corruption or alteration of the findings of a single publication.

- This model attends more to an **integration** function than it does to a **distribution** function as a pressing need of the scientific communities that it supports. It assumes a world in which scientific knowledge bases and tool sets are quite naturally and highly decentralized, even fragmented, according to the centers of excellence and the pools of resources that define their associated scientific communities. This contrasts with the rather more centralized, if distributed, world views implied by the other two models. This model also assumes a world in which scientists choose among a variety of non-profit and for-profit mechanisms and channels that provide them with a wide range of audiences and benefits when they decide how to publish (etymologically, to "make public") their knowledge bases and tool sets.

- The **acquisition and access** function provided by this model (1) is very much more "just in time" (acquisition and delivery of something at the time it is actually needed) than it is "just in case" (acquisition and delivery of something in advance of it actually being needed), (2) is very much more "virtual" (use of something housed by someone else) than it is "physical" (use of something housed by oneself), and (3) the person effecting such acquisitions or accesses is very much more likely to be someone associated with a scientific team, project, or department than it is to be someone associated with university-wide service such as a library, which is not to say that that someone is likely not a librarian. Even so, acquisition and access activities under this model are conducted within a university-wide framework that comprises (1) the university's information technological infrastructure, (2) the university's basic information resources and tools, (3) the training and support services offered by the university, and (4) the information resource and service cooperative agreements and commercial contracts maintained by the university.

- The unique **preservation and archiving** function of this model arises from (1) how difficult it is to distinguish between formal (and, therefore, presumed appropriate for preservation and archiving) and informal (and, therefore, presumed not appropriate for preservation and archiving) communications among scientists, and (2) how difficult it is to differentiate between personal, professional, and institutional interests in and responsibilities for preservation and archiving. This model addresses preservation and archiving as a subfunction of most if not all of the other functions, and it is particularly focused on anticipating preservation and archiving in the **information generation and creation** and **informal peer communication** functions. It sees preservation and archiving as primarily an institutional and professional rather than a personal function. And, it conceives of preservation and archiving as a function that serves scholars who are interested in science as well as the scientists who do science.

- The **storage** function of this model is first and foremost the responsibility of the individual scientist or of the individual scientific team, project, or department who/that generates or contributes a given knowledge base or tool set to the scientific community. Individual scientists and individual scientific teams, projects, and departments may appeal to institutions, professions, or commercial enterprises for assistance with fulfilling this responsibility. Furthermore, as the interests and fortunes of individual scientists, teams, projects, and departments change, the storage function under this model may be assumed by such institutions, professions, or commercial enterprises.

- The **information management** function of this model is quite different than that of the other models. The differences here arise, in the main, from differences already considered above in the discussion of the **information generation and creation, distribution, acquisition and access,** and **storage** functions. Particular attention is paid by this model to information management for the benefit of those who are not on the forward edge of a given scientific research front: cross-disciplinary specialists, students, future generations, and the like. Another special interest in information management under this model is the potential of computer and communication technologies to enable a transition from a world in which scientists look for information to a world in which information looks for scientists: topical subscription services, personalized journals, intelligent agents, and the like. This model addresses information management as a subfunction of most if not all of the other functions, and it is particularly focused on anticipating information management in the **information generation and creation** and **distribution**.

- This model subsumes **location and delivery** under **distribution, acquisition and access, preservation and archiving, storage**, and **information management**. It assumes a highly decentalized and fluid world of scientific and technical information in which the same knowledge base or tool set is available from an ever changing set of suppliers, each of which is able to deliver (access to) that knowledge base or tool set in a variety of value-added packages and according to a variety of technical and financial schemes.

- Scientific **recognition** and reward principles and protocols are rekeyed to account for the distinctive behaviors, processes, structures, and outcomes of this model. In particular, this model requires that science assess, recognize, and reward excellence in the publication of primary research data, tool sets, and other innovative elements of scientific knowledge bases as well as findings and theories such as those that appear in the traditional, primarily print, scientific literature. The model also requires that scientific awards reflect the fact that highly collaborative science complicates the process of attributing credit for a given scientific break-through to one individual or to a relatively small number of individuals.

- This model subsumes **diffusion** under **information generation and creation, distribution, acquisition and access, preservation and archiving, storage**, and, especially, **information management**. A risk of this model is that the information environment of a particular scientific specialty becomes so optimized to the objectives, methods, and findings of that specialty that the environment becomes inaccessible to scientists and other interested parties who do not share that specialty. Partnerships of scientists, information technologists, and librarians are used by this model, particularly in the **information generation and creation** and **information management** functions, to assess and control this risk.

- This model produces major, positive changes in the **utilization of information**, changes that incorporate and extend the positive changes produced by the other two models. These new changes flow, in the main, from the "context of work" that this model creates by providing highly integrated, customized, and responsive access to scientists, instruments, primary research data, tools for analysis and visualization of research data, theories and findings, commentary and opinions, expository and curricular materials, and other people, resources, and services of value to science and scientists. This model also creates this context of work wherever the scientist might be whenever he or she might be there, provided, to state an obvious but important caveat, that the scientist in question has access to the requisite computing and communications technologies at that time and in that place. The dramatic improvements in the utilization of information enabled by this model translate directly into dramatic improvements in the quality, pace, and productivity of scientific research.

Appendix D

THE ECONOMICS OF SCHOLARLY COMMUNICATION: A WORKING BIBLIOGRAPHY

Economics of Libraries and Information:

Baumol, William J. and Matityahu Marcua. Economics of Academic Libraries. Wshington, DC, American Council on Education, 1973.

Brinberg, Herbert. "Information Economics: Valuing Information." *Information Management Review* 4 no. 3:59-63 (Winter 1989).

Byrd, Gary D. "An Economic 'Commons' Tragedy for Research Libraries: Scholarly Journal Publishing and Price Trends." *College and Research Libraries* 51:184-195 (1990).

Carroll, Bonnie. "The Value of Information." *Drexel Library Quarterly* Summer 1985 p. 39-60

Cummings, Anthony et.al. *University Libraries and Scholarly Communication: A Study Prepared for The Andrew W. Mellon Foundation.* Washington, DC: Association of Research Libraries, 1992.

Cummings, Martin M. *The Economics of Research Libraries.* Washington DC: Council on Library Resources, 1986.

Description of Scientific and Technical Information in the United States: Current Status and Trends. (Draft Report).Jose-Marie Griffiths, Principal Investigator. Knoxville, TN: Center for Information Studies, University of Tennessee, July 1991.

"Economic Models for Networked Information," special issue of *Serials Review* 18:no.1-2 (1992).

Griffiths, Jose-Marie. "Existing Cost-Benefit Picture" in *Exploration of a National Engineering Information Service.* Ithaca, NY: Cornell Information Technologies and Media Services Printing, December 1992.

Information Economy in the U.S.: Its Effect on Libraries and Library Networks. Network Planning Paper No. 10. Washington DC: Library of Congress, 1985.

Kantor, P. "Levels of output related to cost of operation of scientific and technical libraries." *Library Research* 3: 141-54 (1981).

Kantor, P. "The NENGIS: Economic Aspects: Costs, Benefits, Sources" in *Exploration of a National Engineering Information Service.* Ithaca, NY: Cornell Information Technologies and Media Services Printing, December 1992.

Kantor, P. " Three studies of the economics of academic libraries". *Advances in Library Administration and Organization* 3 (1986): 221-286.

Katz, Richard N. "Academic Information Management at the Crossroads: Time Again to Review the Economics." *Serials Review* 18 no. 1-2: 41-44 (1992).

BEST COPY AVAILABLE

Katz, Richard N. "Financing New Information Access Paradigms, or Why Academic Information Managers Need Cost Models." *Cause/Effect* 15 no. 2:6-12 (Summer 1992).

Key Papers in the Economics of Information. White Plains, NY: Knowledge Industry Pubs., 1983.

King, Donald W. *Statistical Indicators of Scientific and Technical Communication, 1960-1980; Volume II: A Research Report.* Rockville, MD: King Research Inc., May 1976.

King, Donald W. *Systems Analysis of Scientific and Technical Communications in the United States, Annex 4: The Cost Model.* Rockville MD: King Research Inc., March 1978.

Lewis, David W. "Economics of the Scholarly Journal." *College and Research Libraries* 50 : 674-688 (1989).

Machlup, Fritz. *Information Through the Printed Word: The Dissemination of Scholarly, Scientific and Intellectual Knowledge.* New York: Praeger, 1978.

Machlup, Fritz. *Knowledge: Its Creation, Distribution, and Economic Significance.* Princeton NJ: Princeton University Press, 1980.

Machlup, Fritz. *The Production and Distribution of Knowledge in the United States.* Princeton, NJ: Princeton University Press, 1962.

Rep, Aatto. "The Value of Information: Approaches in Economics, Accounting and Management Science. " *ASIS Journal* 40 no. 2:68-85 (1989).

Rubin, Michael R. *The Knowledge Industry in the United States, 1960-1980.* Princeton NJ: Princeton University Press, 1986.

Rush, James. "In the Name of Access: The Economics of Information Dissemination." *ASIS Bulletin* :13-15 (December 1992/January 1993).

Spigai, Fran. "Information Pricing." *Annual Review of Information Science and Technology* :39-74 (1991).

Stroetmann, Karl A. "Management and Economic Issues of Library and Information Services: A Review of the German Literature." *Journal of Information Science* 17:161-173 (1991).

Taylor, Robert S., ed. *Economics of Information Dissemination: A Symposium.* Syracuse NY: School of Library Science, Syracuse University, 1973.

Taylor, Robert S. *Value-Added Processes in Information Systems.* Norwood, NJ: Ablex, 1986.

Tressel, George W. *A Critical Review of Research Related to the Economics of the Scientific and Technical Information Industry.* ED 111429, 1975.

Van House, Nancy. "Library Resources and Research Productivity in Science and Engineering: Report of a Pilot Study" in *Communications in Support of Science and Engineering.* Washington, DC: Council on Library Resources, August 1990.

West, Richard P. and Richard Katz. "Implementing the Vision: A Framework and Agenda for Investing in Academic Computing." *EDUCOM Review* :32-37 (Winter 1990).

Journal Pricing Studies:

ARL: a Bimonthly Newsletter of Research Library Issues and Actions:

#161, March 2, 1992, "Among the Leading Geochemistry Journals," p. 13
#162, May 1, 1992, "Among the Leading Mass Spectrometry Journals," p. 11.
#163, July 10, 1992, "Among the Leading Women's Studies Journals," p. 7

S. C. Abrahams and R. A. Matula, "Crystallographic Publishing in Retrospect and Prospect," *Acta Crystallographica* a44 (1988): 401+

American Chemical Society, "ACS Journals: Price Comparisons," Washington, DC, May 1988 and other years (unpublished)

American Mathematical Society, "Survey of American Research Journals," *Notices of the American Mathematical Society*, 30 (1983): 715; 33 (1989): 287-291; 36 (1989): 1193 - 1198; 40 (1993): 1339.

American Physical Society, Unpublished Overheads presented to the ARL Scholarly Communications Committee by Harry Lustig, Treasurer, APS, at the ARL Membership Meeting, May 1992.

Jane Baldwin and W. M. Baldwin, III, "Let the Buyer Be Aware: High Price Does Not Necessarily Mean High Quality," *Advances in Serials Management* 3 (1989): 111-129.

Henry H. Barschall, "The Cost-Effectiveness of Physics Journals," *Physics Today*, July 1988: 56-59.

Henry H. Barschall, "The Cost of Physics Journals," *Physics Today* 39 (December 1986): 34+.

Henry H. Barschall and J. R. Arrington, "The Cost of Physics Journals: A Survey," *American Physical Society. Bulletin*, 33 (1988): 1437-1447.

John O. Christensen, "Cost of Chemistry Journals to One Academic Library, 1980-1990," *Serials Review* 18, no. 3 (Fall 1992): 19-34.

John O. Christensen, "Do We Know What We Are Paying For: A Comparison of Journal Subscription Costs," *Serials Review* 19, no. 2 (1993): 39-61.

John E. Costa, Arthur G. Sylvester, "The Crisis in Scientific Publication," *GSA Today* (January 1993): 13-15. (The first in a series of three pieces in 1993; See Molina below).

Economic Consulting Services, "A Study of Trends in Average Prices and Costs of Certain Serials Over Time," Washington, DC, Association of Research Libraries, March 1989.

"European Mathematical Council Survey of European Mathematical Periodicals," *Notices of the American Mathematical Society* 33 (1986): 905.

Lynn Fortney, etc., "Index Medicus Price Study," EBSCO Industries. Three reports in this series have been published as separate large-format booklets.

Kenneth E. Marks, Steven P. Nielsen, H. Craig Petersen, and Peter E. Wagner, "Longitudinal Study of Scientific Journal Prices in a Research Library," *College & Research Libraries* (March 1991): 125-138.

Martin Mulldorff, "A Survey of Statistical Journals," *IMS Bulletin* 21, no. 4 (July/August 1992): 399-407.

B. Meyers and J. L. Fleming, "Price Analysis and the Serials Situation: Trying to Solve an Age-Old Problem," *Journal of Academic Librarianship* 71 (1991): 86+.

Bruce F. Molina, Forum Column: "Issue: Geoscience Literature Pricing," *GSA Today*, March 1993: 58-60. (Part of a series; see Costa above)

Bruce F. Molina, Forum Column: "Issue: Geoscience Literature Pricing (Part 2)," *GSA Today*, April 1993: 93-94, 107. (Part of a series; see Costa above)

S. R. Moline, "The Influence of Subject, Publisher Type, and Quantity Published on Journal Prices," *Journal of Academic Librarianship* 15 (1989): 12+.

Roger Noll and W. Edward Steinmuller, "An Economic Analysis of Scientific Journal Prices: Preliminary Results," *Serials Review* (Spring/Summer 1992): 32-37.

Optical Society of America, "Price Comparison Study of Optics Periodical Literature 1984-1986," Prepared by Myers Consulting Services, 1988.

Periodiques de Chemie dans les Bibliotheques Universitaires," *Bulletin Bibliotheques de France* 32 (1987): 246+.

Paul H. Ribbe, "Assessment of Prestige and Price of Professional Publications," *American Minerologist*, 73 (1988): 449-469.

Paul H. Ribbe, "The Value of Serials: Relevance to Producers and Consumers of Scientific Journals," Proceedings of a Symposium of the Geological Information Society, Dallas, November 1990.

B. R. Spies, "The Effectiveness of Journals in Exploration Geophysics," *Geophysics* 45 (1991): 844+.

Report of the AAU Task Force

on

Intellectual Property Rights in an Electronic Environment

Submitted to the AAU Presidents Steering Committee
April 4, 1994
Washington, DC

Endorsed by the AAU Presidents
April 18, 1994
Washington, DC

TABLE OF CONTENTS

Task Force Members 105

Charge 107

Executive Summary (Including Summary Recommendations) 109

Report of the Task Force

1. Background, Perspectives, and Possibilities 113

2. Why Does Copyright Matter to Universities? 115

3. Principles for the Use and Management of Copyright in Universities 120

4. Universities in Relationship to Copyrights 121

   A. Universities as Users of Copyrighted Materials 121
   B. Universities as Creators of Copyrighted Materials 127
   C. University as Publishers of Copyrighted Materials 130

5. Four Scenarios for Change 133

   Existing Practices 133
   Scenario 1: Enhancing Current Practices 135
   Scenario 2: Faculty Ownership of Copyrights 137
   Scenario 3: Joint Faculty/University Ownership of Copyrights 139
   Scenario 4: Joint Faculty/Consortium Ownership of Copyrights 141

6. Corollary Issues for Further Deliberation 145

   A. Need to commit resources 145
   B. Possible undesirable dislocations in existing markets 145
   C. Possible rationalization of existing markets 146
   D. Changing environment for the creation of added value 146
   E. Academic freedom 147

7. Will Copyright Endure? 149

Recommendations 151

AAU Task Force on Intellectual Property Rights in an Electronic Environment

Task Force Members

Peter E. Nathan, Chair
Provost, University of Iowa

Millicent Abell
University Librarian, Yale University

Prudence Adler (staff)
Association of Research Libraries

Henry H. Barschall
Professor of Physics, University of Wisconsin-Madison

Scott Bennett
R. Champlin and Debbie Sheridan Director, Eisenhower Library, The Johns Hopkins University

David Bressaud
Professor of Mathematics, Pennsylvania State University

Gregory Crane
Professor of Classics, Tufts University

Laura Gasaway
Director of the Law Library, University of North Carolina-Chapel Hill

Jane Ginsburg
Professor of Law, Columbia University

Robert Kraft
Professor of Religious Studies, University of Pennsylvania

Nancy Marshall
University Librarian, College of William and Mary

Peter Menell
Professor of Law, University of California-Berkeley

Ann Okerson (staff)
Association of Research Libraries

Alfred D. Sumberg
Director of Government Relations, American Association of University Professors

Charles Timberlake
Professor of History, University of Missouri

Bernard Rous (ex officio)
Association for Computing Machinery

Colin Day (ex officio)
University of Michigan Press and Association of American University Presses

Task Force on Intellectual Property Rights in an Electronic Environment

CHARGE

A task force of librarians and university administrators knowledgeable about copyright, patent, and other university information policies will be charged with developing proposals for university policies governing intellectual property ownership and rights in an electronic environment. The task force will examine from a university perspective the emerging possibilities for the creation and dissemination of electronically based information, and develop proposals under which universities could provide their faculties and students with new options for collecting and disseminating the products of research and scholarship in electronic environments. Such options could both expand access to university-generated information and reduce the cost of that access.

Background: The rights to intellectual property created by university faculty are frequently given to commercial publishers who then sell it back to universities. An increasing proportion of this information, particularly in scientific and technological fields, is being concentrated among a small number of publishers, most of them overseas, who are increasing the price of this information at rates that exceed any reasonable combination of cost and profit, aided by an environment lacking effective market constraints.

In addition, fair use provisions provided for higher education in the 1976 copyright law are being eroded by a number of factors, including university responses to litigation by publishers. Legal advice designed to reduce exposure of individual institutions has the aggregate effect of limiting faculty and student access to scholarly information.

The development of electronic environments for the collection and distribution of information may provide universities with an opportunity to develop alternatives to the current, commercially dominated system of information creation, distribution, and use. Faculty are exploring the feasibility of forming electronic text centers which would digitize available scholarly information and make it available to scholars over computer networks. Commercial interests militate against the development of these information resources by restricting what information can be included and at what cost.

An analysis of intellectual property rights in an electronic environment may identify opportunities available through a collective response by universities that will not otherwise be realized.

Executive Summary
(Including Summary Recommendations)

Overview

Most research universities already have a set of coherent policies governing intellectual property subject to patent law, mainly developed since the mid 1970s. By contrast, universities have given little attention to intellectual property governed by copyright law even though copyrighted property is used intensively in the classroom, library, and laboratory. Faculty and others at the university create new copyrighted works in immense number each year. University presses build their business on copyrights. All this notwithstanding, university copyright policies are generally narrow, incomplete, and defensive in character. As such, they do not optimize the research, teaching, or service missions of universities.

Current conditions require that universities pay immediate attention to copyright in ways discussed in this report. The utility of the emerging electronic superhighway for higher education will depend on how copyright is managed in this new environment. Higher education will not prosper if universities fail to give focused, coherent management attention to such a crucial resource as the intellectual property their faculty produces.

The roots as well as the extent of copyright policy disarray can be found in the contrast between the teaching and research functions of higher education. The marketplace value of teaching is measured by tuition income (or its equivalent in public revenues), so that numbers of classroom hours and student enrollments are closely monitored, negotiated, and managed by faculty and university administrators. By contrast, most research is regarded by both faculty and their universities as having no direct market value except where patents may be involved. University-based researchers create abundant intellectual property, but with regard to copyrights, faculty are typically free to dispose of this property in whatever way they choose. In fact, faculty generally transfer their intellectual property to publishers, occasionally with the expectation of modest honoraria or royalty payments but most often (especially as regards journal publication) with no expectation of any direct financial return at all.

But when faculty move from being creators of copyrighted property to being users of it, they encounter a number of restrictions that demonstrate the considerable market value of such property, value that results from their own creative activities as well as the improvements provided by the publishers. In literally every facet of teaching and research or scholarship, faculty encounter numerous restrictions on what they and the libraries and computing facilities which support them can do. These constraints derive from the economic interests of the owners to whom faculty have transferred copyright, owners who are exercising the limited statutory monopoly on the expression of ideas that the copyright law grants them.

The Intellectual Property Task Force of the Research Libraries Project (hereafter "the Task Force") believes the higher education community must take a more thoughtful, comprehensive, and purposeful view of copyright matters. The higher education community greatly needs publishing and other information management systems that are more serviceable and financially less onerous than existing ones--especially as regards scientific, technical, and medical journals. To meet this need, the community must work to create a market place for these activities that is economically more competitive, in which copyright monopolies are less constraining. While copyright is not, of course, the only issue to be addressed in restructuring the marketplace for scholarly communication, it is an issue of central importance.

The Task Force believes that one important way in which higher education can be appreciably strengthened is through the development of effective policies for both the use and management of intellectual property governed by copyright law. The report that constitutes the body this document describes the bases for these beliefs. It identifies the stakes higher education has in copyright and enunciates principles that should guide change in the ways intellectual property protected by copyright law should be managed. The report also identifies the many issues universities face as users of intellectual property, as creators of such property, and as publishers of it. Finally, it outlines four broad options for repositioning universities with regard to copyright.

While the ensuing report suggests a range of opportunities for universities to develop coherent copyright policies, it also documents the complexity and far-reaching ramifications of such change. Higher education is now moving between two paradigms for scholarly communication, one based on print and the other conducted electronically. While predictions about particular outcomes and timetables for this fundamental shift vary, there is little disagreement about the epochal and transformational quality of the changes now taking place.

Because issues in the coherent management of copyright are so far-reaching, the Task Force felt it best discharged its responsibilities to the Research Libraries Project by:

- Preparing the following report, which defines the key issues and outlines possible courses of actions; and
- Recommending a process for deliberation within the wider university community on these issues in the process of developing specific models of action.

Summary Recommendations

- **The Task Force recommends that the Association of American Universities, working in partnership with the Association of Research Libraries, continue the process begun in this Project.**

The next phase of this process should build campus consensus and involve other academic organizations, particularly the Association of American University Presses. Coordination could continue under the AAU or ARL rubric using current ARL staffing. If they are available, some of the current Intellectual Property Task Force members could continue working in the recommended groups. Funding to continue the process should be secured.

Following the structure of the Task Force report (Universities as users, creators, and publishers of copyrighted works), the recommendations propose two levels of activity (Local and National). Action areas at each level include:

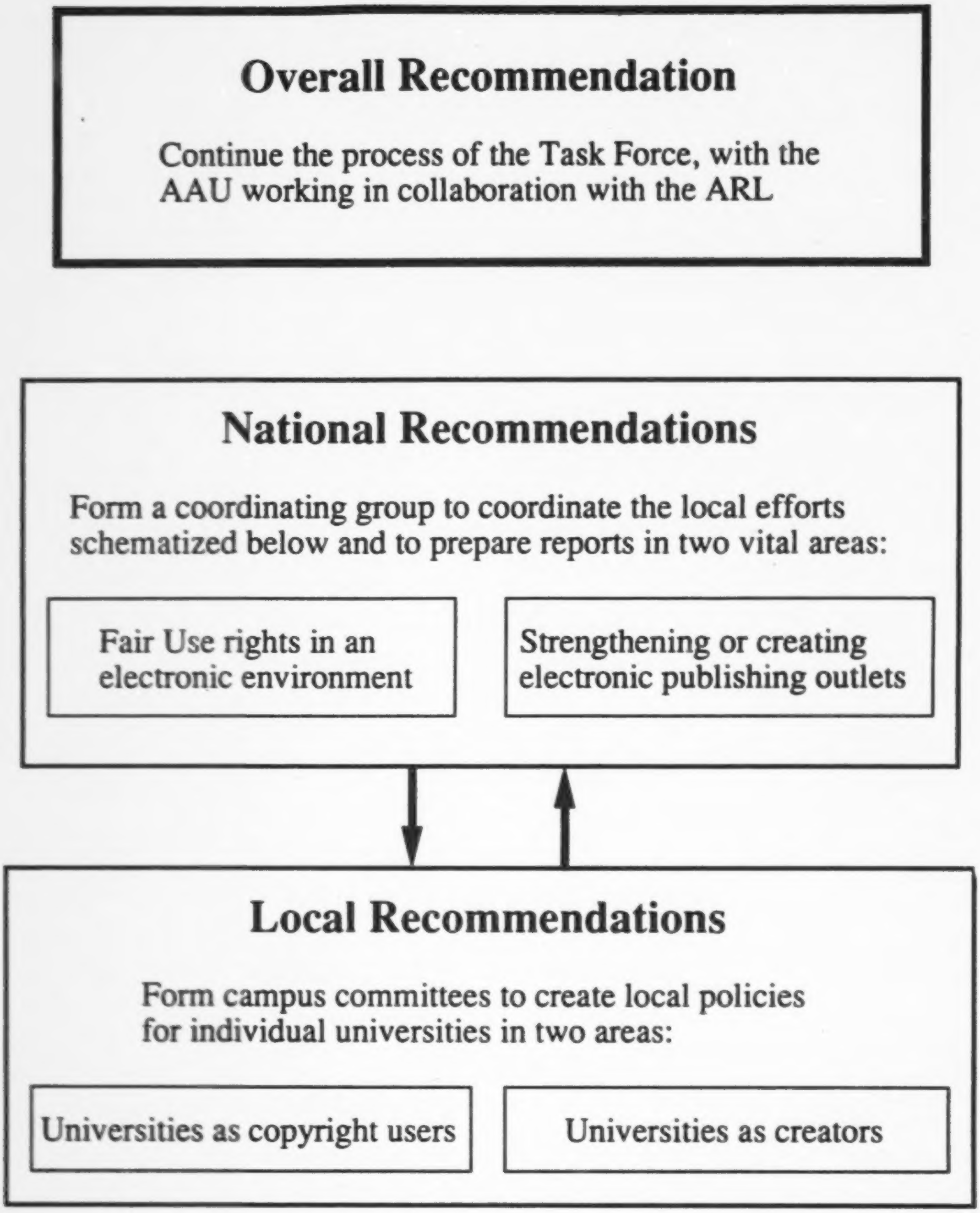
- **Local**. Several institutions would volunteer or be asked to create model policies and documents for their own universities in two areas:

  (1) Copyright use (copying)
  (2) Copyright creation (authorship, ownership, copyright transfer, and licensing).

- **National**. A national group (with representatives from AAU and ARL, adding the AAUP and affiliated academic societies) should be organized to address multi-institutional topics. This group would coordinate, monitor, and disseminate results of the local work to all AAU/ARL institutions. Additionally, it would study and prepare reports and recommendations on the next phase of university IP matters. The reports will include:

  (1) Academic/research community consensus on what should constitute fair use rights in an electronic environment

  (2) Feasibility study on creating and strengthening competitive university and society-based electronic publishing outlets. Strategies would include maximizing the existing university press capabilities and the startup of a cooperative consortium for deposit of scholarly/scientific articles in electronic databases.



Overall Recommendation

Continue the process of the Task Force, with the AAU working in collaboration with the ARL

National Recommendations

Form a coordinating group to coordinate the local efforts schematized below and to prepare reports in two vital areas:

Fair Use rights in an electronic environment

Strengthening or creating electronic publishing outlets

Local Recommendations

Form campus committees to create local policies for individual universities in two areas:

Universities as copyright users

Universities as creators

Report of the Task Force

> That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density at any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Invention then cannot, in nature, be a subject of property. *Thomas Jefferson*

1 - Background, Perspectives, and Possibilities

The Research Libraries Project was commissioned in late 1992 by the Association of American Universities (AAU), an organization which comprises 58 major research and educational institutions in North America. The Project was established to offer guidance to members on key information issues facing them in the last decade of the 20th century and to position them for the 21st century. The general aims of all three Project task forces include optimizing access to and use of information resources and containing information costs, particularly during this time of rapidly changing technologies for creating, distributing, servicing, and storing information. Given the library-focused nature of the Project, the Association of Research Libraries (ARL), representing 119 major research libraries in North America, was asked to be a collaborator with the AAU in shaping the work of the Project. The participation of the AAU and the ARL speaks to a set of common needs of members as well as to their joint -- and unique -- mission within society, a mission focused on education, scholarship, research, and service.

The Intellectual Property Task Force, assigned one of three areas for the Project (the other two are Scientific & Technical Information and Foreign Acquisitions), was charged **to develop proposals for university policies governing intellectual property ownership and rights, to consider opportunities in the intellectual property (IP) area to enhance the collection and dissemination of research and scholarship, and to identify a range of information dissemination opportunities that might become available through a collective response by several institutions**, rather than by any individual ones. The Task Force numbers fourteen members, including university administrators, faculty (among them two legal scholars), and librarians. After an initial meeting, the group felt it would benefit from publisher participation; accordingly a university press director and a professional society publisher were added *ex-officio*. The IP task force understands that the AAU project Steering Committee seeks practical recommendations that can be implemented by some or all AAU and ARL members and lead the way to further discussion and study of pressing intellectual property issues.

Over the course of a year's discussions conducted face-to-face, by correspondence, and by e-mail, the IP Task Force has considered intellectual property from several points of view:

- The university as an institution, with particular reference to maximizing institutional interests in intellectual property. What should university copying policies allow? Who should own the copyrightable material created during university employment?

- The university as individuals and subgroups with different interests at different times as they assume the roles of student, educator, researcher, author, editor, administrator, and publisher.

- Scholarly publishing as a large and variously entwined system of stakeholders including people and institutions not members of AAU or ARL. The information arena is global and scholars and scientists contribute to it worldwide. It is not confined to universities and their presses but encompasses other players, notably learned societies (although these generally have very close ties to universities whose faculty are society members and officers) and commercial publishers.

- The economics of scholarly publishing, including sources of funding for dissemination of scholarly information. Some Task Force discussion focused on the importance of not undermining the existing system out of economic naivete. The Task Force also considered ways of alleviating the current university library information predicament, in which high-priced materials, particularly science, technology, and medicine journals, cause enormous repercussions and affect ability to buy in many other disciplines.

- Old systems vs. new systems. Discussion lingered on how to move from print to electronic distribution formats and on the extent to which new information technologies can be shaped by academe and academics.

This report is constructed in the following sections: Significance of copyright to universities; Principles for the use and management of copyright in universities; Universities in relationship to intellectual property, specifically universities as users, creators, and publishers of copyrighted materials; Scenarios for ownership of intellectual property created as part of university employment; Key issues for further deliberation by AAU and ARL members; and Future Prospects.

Copyright is a complicated matter. It affects many players in disparate ways at any given time. The way in which faculty and universities now treat copyright is often not in their best interests. It is critical that a process be started to maximize the benefits of copyright in institutions of higher education and research. Such a process should be continued under the umbrella of the AAU, ARL, and possibly the existing IP Task Force. There are few easy or immediate solutions but the situation can be greatly improved if the momentum of the AAU Task Force's work is continued.

> As this society moves deeper and deeper into that phase of economic life called 'post-industrial,' where livelihoods are earned predominantly through the sale of information, expertise, and personal services, the extent to which copyrightable creations are protected by exclusive property interests can become central to national growth.
>
> Barbara Ringer, "The Unfinished Business of Copyright Revision," 24 *UCLA Law Review* (June-August 1977): 976.

2 - Why Does Copyright Matter to Universities?

While several types of intellectual property law affect universities and their information needs (patents, trademarks, and copyright), the focus of the AAU/IP Task Force is copyright, the U.S. law and the university policies that govern the *ownership and reproduction* of information fixed in a tangible medium of representation including print-on-paper, sound recordings, motion pictures, art, photographs, computer formats -- in other words, the prime stuff of which research, scholarship, education, and libraries are composed. (Research universities in general addressed patents through a series of policy implementations in the 1970s.) During the development of copyright law revisions in the 1960s and 1970s, universities lived in mostly a print world. In the 1990s, electronic capabilities have taken intellectual property into seemingly uncharted territory in which the stakes are equally high.

Historically, the concept of copyright and copyright law have made it possible for information to be owned, for ownership to be transferred, and for copying to be regulated.[1] What can be owned can be sold; thus a market is born which in turn helps provide incentives for the creation and publication of more information.

The governing purpose for U.S. copyright law is embodied in the Constitution in a phrase that is particularly apposite to the work of the Task Force: to promote the progress of science and the useful arts. Scholars and practitioners frequently speak of the balance between private and public interests that the copyright law aims to achieve, and that many believe it achieves quite well.[2] Because academe's primary mission is to increase learning and understanding of the universe, institutions of higher education hold a privileged place in society. Indeed, the current Copyright Act clearly recognizes an interrelationship between commerce and the well-being of society through special legal provisions for education, scholarship, and study, especially through the provision of "fair use," the right of first sale, special language for library, archival, and interlibrary sharing activities, and public performance rights.

---

[1] An instructive legend is related in Ludwig Bieler, *Ireland: Harbingers of the Middle Ages*, London, Oxford, 1963, p. 11. In the 6th century AD, the king of Ireland resolved one of the earliest copyright disputes (between Columba and Finnian of Druim Finn) by ruling "As the calf follows the cow, so the copy follows the original" The Statute of Anne (England, 1710) is frequently described as the first modern national copyright legislation. While codifying protection for the author, it was, in fact, primarily beneficial to booksellers. See Mark Rose, *Authors and Owners*, Cambridge, Harvard, 1993, for a discussion of the origins of the notion of author as creator.

[2] For a classic article on the balance that the U.S. copyright law archives see Zechariah Chafee, Jr., "Reflections on the Law of Copyright: I," XLV *Columbia Law Review*: 503-529 (1945). For a user-proactive view of U.S. copyright law, see L. Ray Patterson & Stanley W. Lindberg, *The Nature of Copyright; a Law of Users' Rights*, Athens & London, University of Georgia Press, 1991.

From the perspective of higher education, copyright brings both opportunities and problems. AAU and ARL institutions can, and to a great extent do, incorporate the copyright law's special dispensations advantageously into their campus routines. It is impossible to imagine learning or scholarship without making use of information in the classroom, office, research laboratory, or study. At the same time, the existence of copyright gives incentives to create and reap economic rewards. Scholarly publishers have responded to these incentives by publishing a great deal of information indispensable to universities. The copyright-related industries (of which publishing is one, along with film, music, and other related media) are among the United States' strongest overall.

> "In 1991, the core copyright industries accounted for $206.6 billion in value added in real 1992 dollars, or approximately 3.6% of Gross Domestic Product. In terms of value added to GDP, the copyright industries contribute more to the U.S. economy than most industrial sectors and more than any single manufacturing sector including aircraft and aircraft parts, primary metals, fabricated metals, electronic equipment, industrial machinery, food, and kindred products and chemicals and allied products."[3]

Copyright makes this thriving arena possible and information is at the heart of economic growth. With much at stake, copyright owners are diligent in enforcing their rights. A scholar at the University of Massachusetts reports that in five district courts the total number of federal cases filed between 1979 and 1989 increased by about 50% (from 154,666 to 233,539) at the same time that the number of copyright cases during the period more than doubled.[4]

In even the most casual scan of the current university information scene, it is clear that the work of every department and individual is entwined with the legal and practical implications of intellectual property, its management, and its reproduction and use.

- Computers, CD-ROMs, and electronic connections have dramatically expanded awareness of the world's information and intellectual and literary holdings.
- Ubiquitous copying capabilities and ever-faster information distribution modes make it possible to read and share information as never before.
- A voracious and growing appetite for information exceeds the capacity to fund and store all potentially useful information physically at each university.
- Increasingly, members of the campus community expect wide and quick access to offsite as well as onsite information.
- Global scholarly and research communities are evolving, spurred by electronic communications, lists, and publications that cross institutional and geographic boundaries.

---

[3] International Intellectual Property Alliance, "Copyright Industries in the U.S. Economy: 1993 Perspective," IIPA, 1747 Pennsylvania Avenue NW, Washington, DC.

[4] Katsh, Ethan and Janet Rifkin, "The New Media and a New Model of Conflict Resolution: Copying, Copyright, and Creating," 6 *Notre Dame Journal of Law*, Ethics & Public Policy: 49-74 (1992).

- Exponential expansion of networked communications has led to broadened scholarly inquiry and to many new types of publications, resources, discussions, exchanges, and collaborations, all of which are fledglings and many of which are hard to characterize.

- More people are involved in research and higher education than ever before, and, consequently, more research is being published.

- More and more finely subdivided specialties and disciplines seek information outlets; many may be too small for print-on-paper economies of scale.

One of the copyright law's strengths is a lack of specific quantity measures in the "social good" areas such as fair use. The law, legislative history, and adjunct guidelines provide even fewer definitive answers about reproduction or transmission of information electronically than they do about print. The uncertainty affects all areas: classroom and instructional needs; scholarship and research; and library operations such as Reserves and Interlibrary Loan. Yet the law, designed to be "technology-neutral," does offer a road map for institutions of higher learning.

- Permission to reproduce materials for classroom/instructional use is frequently onerous to seek and sometimes too expensive to utilize. In many cases such problems have been self-created through less than advantageous transfer of copyright away from academe.

- Works created by faculty generally arise out of their research and/or teaching employment; those same works, in turn, are used by those faculty in their employment. Currently, most universities express little ownership interest in works created as a result of faculty employment. This situation deserves to become the subject of institutional discussion.

- Cooperative and multiple-creator modes of work are posing new questions about who "wrote" a work and who is responsible for it. Large databases of diverse types of information (textual, numeric, sound, image) lend themselves to incorporation and adaptation in the work of individuals and groups of investigators.[5] Barrier-free use of such work will be critical to transforming academic inquiry.

- Distance learning requires ready and easy access to academically created materials. Many electronic licenses offer this broader access (which was taken for granted in a print-only environment) at prices that are not easily afforded. In some cases no provision is made for such access

- Cooperative preservation and access to materials in the long term is at risk: transfer of ownership outside of academe, even as copyright periods lengthen and technology life becomes shorter and shorter, does not provide insurance that scholarship and research will be available in useful form over time. Electronic information access is increasingly governed by licenses rather than by ownership rights, yet institutions may not be able to preserve access to that which they do not own.

- Research universities do not have the financial resources to meet all the expanding campus needs, expectations, and desires for information. The inability of information

---

[5] In her essay "Some New Kinds of Authorship Made Possible by Computers and Some Intellectual Property Questions They Raise," 53 *University of Pittsburgh Law Review*: 685-704 (1992), Pamela Samuelson summarizes the new authoring modes, challenges, and opportunities.

> budgets and resources to keep up with rising information costs is paralleled by only one other major societal crisis, that of health care. For universities and libraries, information is its daily bread, a staple that is increasingly expensive.[6]

The commercial and legal worlds that share universities' intense interest in the rights to information approach the question very differently. Even back in the "low-tech days" of 1968-1973, a publisher took a major government agency (library) to the Supreme Court over the technology issue related to library photocopying.[7] In 1982 (Association of American Publishers (AAP) v. New York University)[8] and then in 1991 (*Basic Books v. Kinko's Graphics*)[9], the publishing community initiated legal actions involving copying and sale of course packs for instruction. In 1992, the AAP widely distributed two statements that caused concerns for academic libraries, one on Document Delivery and another on Cross-Border Document Delivery. The statements were not worrisome because they affirmed publishers' rights to collect fees for document delivery, but because a target audience for both documents seemed to be ***libraries***; one implication was that libraries' daily chores involving inter-institutional lending were putting them in frequent violation of the copyright law. On panels at conferences, some publisher representatives assert that much if not all of libraries' current Interlibrary Loan operations are illegal and that publishers should receive compensation for practically all copies made in all libraries.[10] In turn, libraries affirm that they uphold the copyright law and pay appropriate fees when their work falls outside the permissible activities of the law.

The rapid growth of digital technologies that promise ubiquitous, ultra-fast distribution of all information (without necessarily ensuring income streams for copyright owners) leads publishers to be cautious in making scholarly publications available electronically. The result is that the fledgling electronic information world is less advanced than many universities and publishers would like it to be. Concurrently, individual researchers and scholars are putting out masses of information on academic electronic networks such as the Internet, bypassing traditional systems altogether and raising questions about the role of publishing institutions and libraries that have evolved over the past three centuries. In their daily work, members of the

---

[6] According to Kendon Stubbs in his Introduction to *ARL Statistics, 1992/93,* Washington, DC, Association of Research Libraries, March 1994, in the six years from 1986 to 1993, subscription prices paid by ARL libraries doubled. Numbers of subscriptions held dropped by 5% in six years and numbers of monographs purchased dropped by 23%. The average price per subscription rose 13% per year and is currently $186.85. If current trends persist, by the year 2000 that subscription price will be around $440.

[7] The Williams & Wilkins Company v. U.S., 487 F.2d (Ct. Cl. 1973), *aff'd per curiam by an equally divided court,* 420 U.S. 376 (1974).

[8] Addison-Wesley Publishing v. New York University, 1983 Copyright Law Decisions, § 25, 544 (S.D.N.Y. 1983).

[9] Basic Books, Inc. v. Kinko's Graphics Corp, 758 F. Supp 1522 (S.D.N.Y. 1991)

[10] According to Carol Risher, Vice President for Copyright and New Technology of the Association of American Publishers, the AAP's position is that royalties have to be paid from the first library copy sent to another institution (*Publishers Weekly,* Oct. 4, 1993: 47). In fact, the authors of this report experienced some difficulty in obtaining this particular article. Finding that the office copy was missing, they asked a nearby publishing organization to fax a replacement so the *PW* article could be correctly footnoted. The organization felt that fair use did not allow them to send such a fax. Additionally, *PW* itself wanted to know the nature and purpose for the citation in order to permit the footnote to be used.

Task Force are aware of these trends; some members believe that every author can become a publisher, too. As publications of an entirely new sort grow and prosper -- ones that current institutions may be ill-equipped to handle -- the role of publishers and libraries may change markedly in the medium term and become either unrecognizable or greatly diminished in the longer term. As one university information specialist noted, talking about traditional publishing and intellectual property protection is akin to sending an expedition to find the New World, even as the Gold Rush is nearly over. One scholar quoted in a national news magazine's lead story on the information superhighway said, "For many people, the network revolution has already happened."[11]

---

[11] James O'Donnell quoted in "Pioneering the Electronic Frontier," 115 *US News & World Report*, December 6, 1993: 57.

Chill the champagne and polish the crystal goblets!
The book of my enemy has been remaindered
And I am glad.

--Attributed to Clive James

3 - Principles for the Use and Management of Copyright in Universities

Given the range of discussion and possibilities, the primary concern of the Task Force was to balance the disparate interests of universities as creators, users, distributors, and maintainers of copyrighted works. Such balancing included trying to answer, among others, the following questions:

- Do recommendations and actions meet the overall educational and service missions of universities? The task force was commissioned by the AAU on behalf of its *institutional* members. The overarching responsibility, therefore, is to guide the institutions' decision-making and policy formulation. At the same time, while putting the universities firmly at the center, the report should recognize the needs of all users in the academy.

- Are recommendations and actions likely to improve access for members of the university? Optimally deployed, copyright ought to enhance or facilitate the best deployment of information and promote and improve access within universities.

- There are real costs in authoring, publishing, organizing, and servicing information, whether in print-on-paper or in new technologies. These costs have to be recognized and supported. (Usable information does not happen most effectively under informal, unruly, spontaneous conditions, though the Internet culture may yet provide a peripheral region of unruly information that usefully supplements more structured communication. In at least this regard, it may alleviate some of academe's cost burdens.)

- Can costs be recovered? Are prices based on cost? Will universities operate more cost effectively (that is, contain increases in operating costs and the high capital investment made in teaching and research)? Comparatively inexpensive per-unit information costs charged by the not-for-profit sector and a number of commercial publishers seem preferable to pricing based almost entirely on what the market will bear (see also Science/Technology Task Force statement on this topic).

JAQUES. All the world's a stage,
And all the men and women merely players;
They have their exits and their entrances;
And one man in his time plays many parts. . .
As You Like It, Act 2, Scene 7, lines 139-142

4 - Universities in Relationship to Copyrights

The IP Task Force believes that universities need to develop, implement, and promulgate clear policies regarding copyrighted information where such policies do not currently exist. Universities and members of the university community have many copyright roles: they are users, creators, maintainers, and distributors of intellectual property. Copyright policies governing two sets of roles are particularly vital: (1) universities as users, including individuals and libraries making copies for educational, scholarly and research purposes as well as librarians preserving the body of knowledge in perpetuity, well after any publisher derives material benefit or has any interest in it; (2) universities as creators, through the substantial numbers of copyrighted works produced by their faculty and staff. A third role of great potential for the management of copyrights and scholarly communication includes universities as publishers.

A. Universities as Users of Copyrighted Materials

> Universities must develop carefully articulated, comprehensive and nuanced copying policies that inform the university community about the explicit rights and obligations they have under the copyright law. Such policies are also instruments to engage and inform faculty on issues that often seem complex, opaque, or sometimes unimportant. Policies should provide convenient guidance for all segments of the community as they pursue their daily business of teaching, researching and writing, learning, and information management; policies help avoid infringement of the copyright law.

Discussion

It is part of the routine activity of universities to use copyrighted materials produced by others. Students, teachers, and researchers read, study, copy, teach, show and cite others' work from articles, books, newspapers, CDs, videos, microfilms, multimedia, etc. Libraries make copies for readers, share copies of materials with other libraries, and make copies for long-term storage and preservation. During the revision of the copyright law which took effect on January 1, 1978, Congress incorporated several special provisions into the law to promote the dissemination of knowledge in support of teaching, research, and public service missions of the academy.

The special provisions afforded to education and scholarship are described in several sections of the Copyright Act of 1976 itself. Additionally, several guidelines exist adjacent to the copyright law. While none of them has legal standing, they do represent a consensus within some parts of the publisher/user community and present views on the minimum copying allowable under the law. Presumably, compliance with the guidelines would assure that there would be no litigation from copyright owners.

Section 107 - Fair Use.

Fair use is codified in Article 107 of the Act and, within reasonable limits, offers privileges for educational, scholarly, and personal copying without permission from the copyright holder. The 1976 Act was the first revision in which fair use was given statutory status. Section 107 enumerates four factors that need to be considered case-by-case to make a fair use determination (purpose of use, nature of use, amount, and market effect). There are no precise quantity measures; the factors must be assessed together on the facts and merits of each specific case. Fair use is nonspecific enough to allow substantial latitude in interpretation and can cause publishers a great deal of concern. By balancing educational and public rights, Article 107 in the copyright law strongly fosters much of the constitutional purpose of promoting science and the useful arts.

The future of fair use is not assured in the electronic distribution modes. Publishers tend not to allow purchasers to own electronic information outright; rather, they license electronic information according to specific contractual provisions including such specific boundaries as number of campus users, number of simultaneous users, number of sites, and so on. Further, the very ability to count individual uses or users seems to offer at least some information producers an impetus to charge on a per-use basis. The continuance of fair use is identified over and over in writing and discussions as an area that needs a great deal of attention in the emerging electronic arena. For the Task Force, it is an area of primary concern.[12]

Section 108 - Library & Archiving Provisions

Section 108 of the Act offers privileges for libraries open to the public or outside researchers and it allows these libraries, for instance, to make a preservation copy if one cannot be reasonably purchased, to make a copy for a patron's use, to allow unsupervised copying provided a warning notice is posted, and to engage in lending copies provided that the purpose of lending is not to substitute for subscription or purchase of a work. This section recognizes the several public benefits delivered by libraries that advance the constitutional purpose of the copyright law.

Sections 109, 110, 117: Performance/Display Provisions; Software

Section 110 allows teachers to perform works and display motion pictures and videos in classrooms, and it permits institutions to transmit broadcasts of certain works in places of instruction. Section 117 permits the owner of software to adapt it for use on a computer, to make a copy when it is an essential step to use it on that machine (such as to load it on a hard disk) or to make a backup copy under certain conditions.[13] Section 109 allows nonprofit libraries to lend software for nonprofit purposes. The software must have a warning placed on it in accord with the Register of Copyright's regulation.[14]

---

[12] Jane Ginsburg, "Copyright Without Walls? Speculations on Literary Property in the Library of the Future," 42 *Representations*:: 53-73 (1993). Ginsburg analyzes the differences between fair use in print-based and digital information environments and reasons that if fair use does survive, it must be a new sort specifically devised for the new digital communications capacities.

[13] The software provision does not clearly distinguish between computer code and works that are presented in an electronically coded medium such as a diskette, CD, etc. The Section 101 definition is "A set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."

GUIDELINES: Interlibrary Loan Guidelines

The Interlibrary Loan Guidelines negotiated by CONTU (The Commission of the New Technological Uses of Copyrighted Works under section 108(g)(2) of the Act, define interlibrary loan arrangements that do not run afoul of the "aggregate quantities" prohibition. This is the so-called Suggestion of Five, the safe harbor guideline (often called the CONTU Guidelines).

Under the suggestion of Five, a borrowing library may request five items from a copyrighted non-serial publication each year that the work is protected by copyright. From periodicals, however, the borrowing library may request five items from a periodical title going back five years. If the library owns the title, but the issue or volume is missing from its collection, the request does not count in the Suggestion of Five. Likewise, if the library has the title on order it does not count in the Suggestion of Five.

The Guidelines further require that the borrowing library certify that the request is within the Guidelines and that it retain records of interlibrary loan requests for three calendar years. The records must be accessible by title. There is no reason to retain records longer than the mandated three calendar years. The onus for both the certification and the record retention requirements i on the borrowing and not the lending library.

If it is within the Guidelines for a library to request and receive a photocopy of an article, it is permissible to request and receive an electronic copy. This presumes that the copy received becomes the property of the user who initiated the interlibrary loan request and that neither the lending nor the borrowing library retained a scanned copy. Retention of scanned copies and the storage of them raises many issues that are vexing, complicated, and not necessarily entirely clear from a reading of the Act.[15]

Classroom Guidelines

During the revision of the Copyright Act, educators asked for specific numerical guidelines (more specific than the fair use provisions) about their copying rights for the classroom. Affirming that the law ought to be descriptive rather than prescriptive, Congress encouraged the interest groups to create mutually acceptable guidelines. The outcome was the "Agreement on Guidelines for Classroom Copying in Not-for-Profit Educational Institutions." In contrast to fair use, which is flexible and case-specific in interpretation and implementation, the *Classroom Guidelines* establish zones for amount of classroom copying permitted. Additionally, they impose requirements of brevity, spontaneity, and cumulative effect. The adoption of the *Classroom Guidelines* into a number of campus copyright policies was hastened by the lawsuit the Association of American Publishers (AAP) filed against New York University in 1982 and possibly by the Kinko's decision which also endorsed the *Guidelines*. Many college and university personnel remain unhappy with what they see as the impediments of guidelines more suited to the K-12 environment. The chief problems are the high cost for classroom copies and, at times, delays in receiving permissions. Either or both of these problems can make it

---

[14] For detailed and practical elaboration on what each of these sections and the guidelines means for libraries, see Laura N. Gasaway and Sarah K. Wiant, *Librarians and Copyright; A Guide to Copyright in the 1990s*, Washington, DC, Special Libraries Association [forthcoming June 1994]. Chapter 5, "Audiovisual and Non-print works," is particularly apposite in setting out the issues and identifying what kind of use and copying are appropriate.

[15] This section is supplied from the draft of a talk given by Laura Gasaway.

impossible to use desired material for teaching. The Copyright Clearance Center[16] now has in place an extensive course pack program and has started development of a comprehensive university licensing program which it hopes to roll out in fiscal year 1995. This system may offer some relief over time, but in the meanwhile, experiences with unacceptable permissions situations abound.[17]

At the same time as the *Classroom Guidelines* were developed, faculty at the University of Wisconsin-Madison drafted an alternative set of guidelines which were adopted as that University's copyright policy in 1978 (rev. 1982). Wisconsin's policy set far more generous classroom copying allowances than the *Classroom Guidelines*. Nancy Marshall, then a senior librarian at the University of Wisconsin (and currently a member of the AAU/IP Task Force), participated in the development of the Wisconsin policy. Subsequently Chair of the American Library Association's Copyright Subcommittee, she led the adaptation of the Wisconsin work into ALA's "Model Policy Concerning College and University Photocopying for Classroom, Research, and Library Reserve Use" in 1982 (rev. 1986). Nonetheless, according to a copyright policy analyst, the more conservative *Classroom Guidelines* tend to inform university policies on the order of about 4 to 1 over the ALA work, even neither the ALA nor the Wisconsin policy have ever been challenged in the courts.[18] In fact, in 1991 the University of Wisconsin-Madison revised its classroom copying policy, making it more cautious than it had been for the previous 10 years.

Other Guidelines: Off-Air and Music

The Off-Air guidelines provide educational institutions the ability to record television programs and to retain the tapes for no more than 45 days with only one teaching use and one "reinforcement" use. In brief, anthologizing, extracting, retention, and repeated uses require the permission of the copyright owner.

Observing these several areas of copyright activity, a subgroup of the IP Task Force characterized current campus copying experiences. According to their deliberations:[19]

- The campus community is, in general, under-informed about copyright; there is a lack of understanding and knowledge of the current law and how it applies to daily transactions (though cases like *NYU* and *Kinko's* trigger negative responses to publishers

---

[16] The Copyright Clearance Center is a reproduction rights organization in the United states. Its role is to serve as a centralized clearinghouse for copying authority and royalty payments to copyright holders. Many countries have their own CCC equivalent. ASCAP and BMI are rights organizations for music broadcasting.

[17] Examples of inability to locate rights holders and to afford copyright fees abound in higher education publications and even in publishing outlets. For example, the *STM Newsletter*, June 1993: 23-24, recounts one Harvard faculty member's long and sad story of being bounced between publisher, CCC, and Kinko's. It was a model exercise in perseverance which resulted in, theoretically, the commission of an illegal copying act!

[18] The two policies are compared and discussed in context in Ken Crews' thorough study of research university copying policies, *Copyright, Fair Use, and the Challenge for Universities: Promoting the Progress of Higher Education*, 47-53, Chicago, University of Chicago Press, 1993.

[19] The subgroup, headed by Nancy Marshall, included Robert Kraft, Al Sumberg, and Charles Timberlake.

110

among the faculty).

- When faculty have questions or concerns about copyright, there is usually no centralized campus information resource, and there is little campus support for dealing with copyright issues.

- The copying environment is more constrained than it needs to be, for fear of possible litigation; this is particularly true in the areas of classroom copying and fair use.

- Publishers are far more aggressive in asserting their rights in this domain than are universities and their faculties.

- Universities have been slow to develop a comprehensive life-cycle vision for the management of copyright. The development and implementation of a common vision appears to have been hobbled by the competitive aspects of research and decentralized nature of major research universities and the lack of intellectual community between disciplines.

Specific problems persist. For example, it is common for faculty or staff to seek permission from publishers where permission is not required, including permission to make more than one copy of an article on reserve or multiple copies for classroom distribution. Publisher memoranda (such as those circulated widely by the AAP regarding Cross-Border Document Delivery) may deter college and university libraries from pursuing enhanced resource sharing arrangements. It may incline them toward paying royalties when it is not necessary to do so. Major impediments in electronic distribution have the potential to render whole areas dysfunctional: e.g., restrictions on multiple-user access to full-text material and electronic reserves. The whole area having to do with the creation and reproduction of audiovisual and multi-media materials for library or classroom use has become particularly critical; the questions of what is permissible abound. The signing of highly restrictive electronic information licenses by libraries, faculty, and academic departments is a frequent concern. In an increasingly global world, trans-border data flow of electronic information and use of electronic networks coupled with differences in national copyright laws -- and the adoption of the Berne convention[20] -- create a complex environment that needs to be clarified.

Much of the complicated picture painted here can be resolved by consulting and studying the current copyright law itself. If universities act on the law's articulated position that it is neutral about technology, then the legal status of reproduction, transfer, and use and the plethora of other issues surrounding electronic information may not be so uncertain, although still open to discussion, interpretation, and policy formulation. Concepts like copying and fair use can be at least provisionally translated into the electronic arena, if their underlying purpose is clearly understood and retained.

The IP Task Force's general observations are supported by a comprehensive study published in December 1993.[21] For his analysis, Kenneth Crews used the same base of organizations that are sponsoring this effort -- the AAU and the ARL -- and obtained 98 research university copying/reproduction policies or responses to surveys and questions about them. Sixteen institutions had no written policy or standard. Between them, the remaining 82 proffered 183 distinct policies varying in scope and format (these included formal policies, memos, procedures, and guidelines). Taken together, the policies revealed instructive patterns. For instance, the majority did address research, classroom, reserve, library copying, and interlibrary loan. Some addressed library copying only, indicating that campuses have different perceptions about whether copyright is a university issue or only a library issue. Only a minority of policies addressed non-print media in any systematic fashion. Virtually no policies were comprehensive. Policies were characterized by lack of coordination on campus, and some universities had two or more current policies -- which were not always consistent. Respondents were not necessarily aware of the campus policies that were in existence. The development of copyright-related policies on campus was often fragmented between centers of responsibility. Faculty had a "surprisingly small" role in developing such policies, which were most often developed by librarians (48.6%), administrators (26.8%), and legal counsel (15.8%). Faculty involvement was identified at 3.3%[22]

---

[20] In brief, the Berne Convention, to which the U.S. is a signatory, states that in the arena of copyright, foreign works are treated as if they are domestic, i.e., a book published in Germany enjoys the same protection in the U.S. as if it were published in the U.S. The ramifications can, in fact, become complicated and controversial. The Berne Implementation Act of 1988, Act of Oct. 31, 1988, Pub. L. No. 100-568, 102 Stat. 2853.

[21] Crews, op. cit.

According to Crews, this low level of faculty involvement suggests that the driving force behind policies may be the legal rights of copyright owners and concerns about institutional liability. The need to avoid the risks of potential infringement and lawsuits rank high as the stated reasons for copying policies on campus. To substantiate those observations, the study notes that policy-writing rose sharply right after the NYU infringement lawsuit settlement. Eleven policies refer to that litigation as a basis for their creation. Adoption of the "safe" Classroom Guidelines in the majority of these institutions seems to be directly related to the litigation, an action which also led university attorneys into a key role in shaping university copying/copyright policies. None of Crews' findings is counter-intuitive except for one: that there is a tendency on the part of librarians to write the more conservative library copying policies. On the one hand, this observation should reassure publishers that librarians are indeed cautious and highly compliant towards the "safe harbor" standards supported by publishers. On the other hand, it suggests that the research library community could have better availed itself of the full range of the public good provisions of the copyright law, particularly fair use and Section 108 provisions.

While the Copyright Clearance Center's blanket licenses for copying on campuses and its academic permissions service offer universities some assistance, institutions who sign up for them should have first resolved their views on fair use issues, e.g., at what point in the copying process and under what circumstances should fees appropriately be paid. Fundamental policy decisions will shape the way in which copying arrangements and licenses are negotiated with a variety of brokers and suppliers. Institutions that resort exclusively to some forms of collective administration may be failing to recognize legally established opportunities that can further their academic--and financial--objectives. Many institutions seek to swap copyright dilemmas for collective assurance. The better policy would be to encourage both fair use and collective copyright administration systems to coexist; both systems must be optimized to best serve the academic mission.[23]

---

[22] Crews, op. cit.: 63

[23] Crews, op. cit.: 129. The IP Task Force identified two academic copyright policies that were exemplary in certain areas. Georgia Harper, General Counsel, University of Texas System, has written "Copyright and the University Community," a document strong in its coverage of all formats. The section called "The Future of Professional Fair Use" (p. 42-44) is particularly worthwhile. Wellesley College's copyright policy (March 1993) is thorough in its treatment of library copying. Both

B. Universities as Creators of Copyrighted Materials

Clearly articulated policies on ownership of works written as part of university teaching, research and scholarship are the other half of a comprehensive university copyright policy. (The first half is addressed in the previous section. A well thought-out ownership policy also serves as a significant component of the copying policies advocated above.) Currently, most universities express little or no interest in owning or managing copyrights, giving faculty total ownership discretion over copyright transfer. Faculty deem the appearance of their work in prestigious outlets to be of such value that in exchange for publication they gladly transfer away ownership rights which they regard as financially inconsequential. But the financial consequences for the institutions are serious.

Universities have a vital and substantial economic interest in the proper management of intellectual property arising from the copyrights that their faculty create. While not reaching consensus on any single best model, the IP Task Force offers four ownership scenarios with accompanying discussions of their pros and cons.

Discussion

In the early to mid-1970s, universities began to appreciate the value of intellectual property in the form of patents and began to exercise a joint patent interest with faculty members. The principal goals in the joint management of patents were to transfer technology from the university to the marketplace effectively, aid in the complex filing and registration process, and secure potential revenue streams. The interests of universities led them to create substantial organizational and staffing capabilities, which led in turn to the creation of a robust and thriving Association of University Technology Managers (AUTM) designed to express a community of interest about patents and software. We do not suggest that copyrights and patents are identical, for clearly they are not. Patents exclude others from making, using, or selling the invention; copyright confers limited monopoly rights for reproduction, preparation of derivative works, distribution of copies, public performance, and public display. Patents extend for 17 years from date of issue in the US; copyrights begin at time of creation and last for 50 years plus the lifetime of the author (as a general rule, though there are exceptions). The right to patent is based on originality and function; copyright applies to original works fixed in a tangible form. The categories of material covered are different in patents and copyrights. And it costs approximately $10,000 to obtain a US patent, while it takes $20.00 to register a copyright, and registration is now optional even if desirable.[24]

For all these differences, one particularly important similarity links patents and copyrights: university faculty, researchers, scholars, and other community members create -- are hired, retained, and rewarded for creating -- inventions and copyrightable material, both of which are forms of intellectual property. Both have value: the patent has a potential value that is achieved if it subsequently earns revenue; the copyright has value because universities spend substantial amounts of money purchasing copyrighted materials, often materials initially produced by universities. In ARL institutions alone, about half a billion dollars were spent on

---

organizations have given permission to mount the policies on the Association of Research Libraries' Internet gopher. To access from an Internet prompt, type: gopher arl.cni.org. Open the Scholarly Communications menu item and then the Copyright section.

[24] Katherine Ku, Office of Technology Licensing, Stanford University, fax dated Oct. 19, 1993.

acquisitions in 1992/93 academic year[25]. With such sums at stake, university-generated copyrights deserve knowledgeable treatment.

During their term of employment, campus faculty, staff, and students produce many types of copyrightable works related to universities' larger mission. These publications can be traditional or electronic and include books, articles, pedagogical materials (syllabi, bibliographies), research data, dissertations, software, databases, dramatical works, musical works, multi-media packages, and other types of intellectual property. With the exception of textbooks and imaginative literature (either may be a substantial revenue source for authors) and some scholarly monographs (that may earn modest royalties), faculty generally do not receive payment from publishers for their creations. For the most part, faculty do not pay for the library materials and services they receive with their own or with departmental funds. In consequence, many do not believe that their copyrights have significant economic value to themselves or their institution. This perception can only encourage the common practice of signing copyright away in entirety. Most faculty only become aware of some consequences of transferring their ownership when they find that they need to obtain their publishers' permission to copy their own work for the classroom or for derivative works. "But *I wrote* it!" is perhaps the most plaintive cry heard at the photocopying machine.[26]

As part of the work of the IP Task Force, a member analyzed 39 university ownership policies supplied by Alfred Sumberg of the American Association of University Professors. The brief study reveals:[27]

- Not all university ownership policies were revised after the 1976 Copyright Act came into effect; accordingly, some policies appear to address a world in which changes in the law are not recognized.

- As noted in the Crews study[28] some institutions have more than one policy (for the academic and research sides of the institution, for example) and they do not necessarily agree.

- Length and clarity vary dramatically. Policies range from half a page to 30 pages. The briefer policies are likely simply to affirm that faculty own their copyrights, with no further guidance or information. Greater length does not necessarily yield greater clarity. The longer policies may be very complex; on reading them, the faculty member may be confused about what is owned by whom.

---

[25] *ARL Statistics, 1991/92*, 32. Washington, DC, Association of Research Libraries, 1993.

[26] The Task Force noted that the ownership of copyright is of concern not only to academic authors and institutions, but to writers in general. On October 18, 1993, The Authors Guild and The American Society of Journalists and Authors issued a position statement on Electronic Publishing Rights. From the opening paragraph: "Some publishers have routinely asked writers to sign away--without compensation--all rights to electronic use of the work they have created. Indeed, many have sought to make writers' work available in 'any medium yet to be invented.' Writers and their professional organizations must resist this attempt to seize creators' rights."

[27] The work of reading and annotating the 39 copyright policies was largely done by Allyn Fitzgerald, a law school graduate and research assistant at the ARL.

[28] Crews, op cit.: 56-69.

- In only two instances is there a claim to university interest or ownership.

- Though in general policies recognize faculty ownership of their own works, policies offer little or no help with the complex decisions about rights transfer or licensing. One result is that works are likely be assigned totally to publishers, even though the goals of a number of these publishers may be quite different from those of non-profit educational institutions.

- Only a handful of these policies mention intellectual property officers or university committees as resources for problems or disputes. Anecdotal evidence suggests that responsibility for advice is exercised, if at all, by the university legal counsel, the administration, the library, the press, or word of mouth.

- In short, it would appear that neither universities nor their faculty exercise much care in the management of copyrights; most publishers, on the other hand, manage copyrights carefully and exploit them fully.

A literature search on the topic of who owns copyrighted materials in universities shows a smattering of publication, little of it current. Except for some articles discussing whether the 1976 Copyright Act might prompt universities to mandate that works produced by faculty be works-for-hire,[29] there exists a *de facto* long-standing and little-examined assumption that faculty should be sole owners of copyright. Reasons for this assumption are uncertain.[30] There is little or no available literature on university copyright ownership that offers options, models, or policy analysis. However, a model policy from the Triangle Research Libraries Network (TRLN) exists and is widely available on the Internet. It assumes initial individual faculty ownership and advocates subsequent individual faculty retention of copyright instead of the usual copyright transfer to publishers.[31]

Because the IP Task Force concluded that universities should exercise their ownership interests systematically and coherently, it created several management scenarios or models for more detailed discussion. These scenarios were narrowed to the four described Section 5 of this report[32] Each had more than one advocate in the committee, for there are significant choices and tradeoffs. Nonetheless, it is clearly possible to bring rational arguments, clarity, organizational purpose, and practical help to the discussion of university management of copyrights. The least attractive option of all is to continue in the present mode, with AAU/ARL institutions working with unclear policies in an unmanaged copyright environment.

---

[29] Laura G. Lape, "Ownership of Copyrightable Works of University Professors: The Interplay Between the Copyright Act and University Copyright Policies," 37 *Villanova Law Review*: 223-271 (1992). Lape addresses the questions of who now owns the copyrightable works of professors, how universities attempt to control such ownership issues, and offers a way to approach the matter. A good survey article.

[30] In her footnotes, Lape, op. cit. summarizes the handful of articles written on this topic and cites arguments for faculty ownership made by Dreyfuss and Duboff. Also, a well-known ruling is the *National Labor Relations Board v. Yeshiva University* (NLRB v. Yeshiva Univ., 444 U.S. 672 (1980). The case held that full-time faculty are managerial rather than professional employees and are thus exempt from coverage of the National Labor Relations Act. The case has been used by some legal scholars to advance the argument of university faculty as semi-independent agents rather than employees whose copyrighted works might be considered works-for-hire.

[31] Revised and circulated widely on the Internet over the past two years, this document has generated interest from some creators and dismay from some publishers. To access it, from an Internet prompt type: gopher sunsite.unc.edu. Then open UNC Information Exchange menu.

[32] This subgroup was coordinated by Laura Gasaway and included David Bressoud, Ann Okerson, and

C. Universities as Publishers of Copyrighted Materials

Overall, universities rarely have a comprehensive idea of what is being published on campus or of the publishing investment they are making. Universities often do not fully recognize that they **are** publishers engaged in activities ranging from completely informal to the most formal publishing. Informal publication includes ephemeral materials for which copyright exists under law but which would never be asserted. Press releases, course offerings, calendars, services brochures, and some forms of electronic offerings such as informal topical discussion lists typify informal publications. Yet another arena is the preparation and production of classroom course materials or anthologies. Often sizeable staff are employed to produce these publications. The formal side of university publishing is typified by the books, journals, and other formats published by university presses. Formal publishing may also originate with departments or institutes and can include print publications, databases, software, videos, preprints, working papers, journals and symposia. Universities usually do not seek a financial return from such informal publications. Revenue-generating departmental publications may be used to support the departmental budget or otherwise unbudgeted activities. In the case of working papers or preprints, the university may subsidize copying and distribution to other institutions.

University presses are generally the locus for the most formal university publishing activities. These presses may operate at a profit, break even, or receive subsidies. There are scores of university presses in North America, some of them rivaling commercial publishers in size while others are relatively modest. Some have a history of distinguished publishing reaching back 100 years or more; others reflect the vigorous expansion of higher education after World War II. Together, these presses published over 7,000 new titles in 1993, or about 1/7th of all U.S. published books in that one year. These presses command a world-wide market.[33] They manage copyrights more actively and purposefully than any other unit of the university. They are one of the chief guarantors of independent and high editorial standards for scholarly communication. These presses ensure the survival of the serious scholarly monograph on this continent and are important publishers of books of regional interest and of belles lettres. They find a significant readership among well-informed people beyond the confines of higher education.

In these ways, university presses serve the academic community extraordinarily well and remain prized agents for advancing learning. All these strengths notwithstanding, university presses exhibit serious structural weaknesses:

- The scholarly monograph is the primary product of university presses, and the cost of publishing such works is becoming increasingly unsupportable. As scholarly publishing grows in size but depends on more and more specialized titles, the audience for a given book becomes smaller. The fixed costs of publishing must be supported by fewer buyers for each title and by larger publication lists. These financial pressures create an unfavorable spiral of costs for conventionally published scholarly monographs from which no escape is evident. This situation is partly true for journals as well.

Charles Timberlake.

[33] From statistical data supplied by Peter Grenquist, Executive Director, Association of American University Presses, memorandum dated 3/22/94.

- A few university presses have significant journals programs, primarily in the humanities and social sciences. Only two or three university presses have significant publishing programs in scientific, technical, or medical journals. Most university presses have no significant presence in journals publishing at all. As a result, university presses taken as a whole contribute little to that half or more of scholarly communication which is conducted through journals. Their absence is the more to be regretted because of the key importance of journal literature to all fields and the intractable price increases libraries face for journals, especially those published by for-profit publishers in science, technology, and medicine.

- Many university presses are capital starved. Many of them must earn back in current sales all the money they spend in a given year. This financial inflexibility makes it difficult for them to compete with large commercial publishers for new or existing journal titles, especially in the high cost areas of science, technology, and medicine. It also constrains the presses' ability to pursue innovative projects in electronic publishing.

- Faculty innovators wishing to exploit the capabilities of networked publication frequently (but not always) disregard university presses. In this measure, the presses are losing their most likely allies and their best leverage on publishing innovation.

- University presses are increasingly required to operate with little or no university funding. They are not closely integrated into the university's overall information creation, management, and dissemination activities (as conducted, for instance, by libraries and academic computing centers). In these ways, they are forced to the margins of institutional life by their "supporting" universities.

None of this suggests a healthy prognosis for university presses. The problem is not that university presses are poorly managed. It is, rather, that they are not being asked by universities to do some of the things they can do well and that most urgently need to be done, especially in establishing viable and prestigious alternatives to expensive commercial journals in science, technology, and medicine. They are not provided with the necessary financial basis for such activities, nor are they brought into strong collaboration with the university's other information management agencies.

From this perspective, universities are arguably wasting the publishing assets they have built over many years at precisely the time when the university's inability to control the costs of scholarly communication is most evident and most threatening to the vitality of the research mission of the university. From this perspective, business as usual at university presses is a self-destructive behavior on the part of higher education. The potential of the presses to be a major asset in regaining control of scholarly communication may be great and ought to be realized.

5 - Four Scenarios for Change

While the Task Force was keenly aware of the ways in which teaching, research, and service depend on the use of copyrighted works, it focused most of its discussion on universities as creators of copyrights and possible changes in the ways universities manage copyrights. It chose this focus because these matters are attracting attention elsewhere, because copyright management is central to electronic scholarly communication, because universities might gain market leverage by changing the management of copyrights, and because purposeful copyright management is so notably absent from university policy statements on intellectual property.

A subgroup of the Task Force was charged to describe several distinct scenarios for improving the management of copyrights created at research universities. The resulting scenarios were distinctive, though some overlap with others. They are to some extent imprecise and impressionistic; nonetheless, they have proved highly useful in focusing discussions within the Task Force. The scenarios are reported to help start and shape the wider discussions and policy creation that the Task Force recommends.

Some scenarios are closely related to others. For example 1 and 2 differ in degree rather than philosophy. Numbers 3 and 4 diverge on the issue of whether faculty will be required to share copyright or whether alternative publishing incentives will be created to entice them into placing their work into a shared repository. The purpose of sharing copyright with a university or consortium is that ultimately the institutional owner would serve as guarantor of wide electronic access, archiving, and use of the materials.

None of the first three scenarios precludes creating the publishing consortium outlined in the last one. The scenarios do not pursue the possibility of total university ownership or work-for-hire. Though that has some merit, the Task Force judged it possibly too contentious to be expedient.

The Task Force felt the further refinement of these scenarios and the full articulation of their operation was best left to the further deliberations it recommends.

Existing Practices

Most universities assert no ownership claim on the copyrights faculty create. Faculty are left free to dispose of their copyrights in any way they choose. Normally, faculty are likely to transfer their copyrights to publishers; in some cases they may retain certain rights or, much more rarely, retain the entire copyright and grant a license to the publisher for the use of the copyright. The most frequent--though still rare--exception to these practices is the assertion of university ownership of copyrights created by faculty under work-for-hire clauses in some grant and contract situations.

Publishers' practices mirror these university arrangements. Especially for journal publication, publishers request and generally require authors to assign their entire copyright to the publisher. Although some publishers offer terms that permit the author to retain some limited rights, the common practice is for publishers to require the transfer of the full copyright of the work in any and all media. In order to be published, and usually without conscious attention to the consequences, faculty, research staff, and other university employees sign such transfers and thereby put themselves and their institutions in the position of buying back subsequent uses of their own work.

The overall objectives that might inform change in these arrangements were identified in Section 3 of this report. More specific objectives would include (i) facilitating the re-use of copyright works in classrooms and the library, (ii) securing publication under terms more favorable to higher education, and (iii) reducing the cost to universities of journal subscriptions, particularly for scientific, technical, and medical titles.

The Task Force notes that current author's practices of copyright assignment appear to be starting to change from a monochromatic, total assignment to publishers to retention of some rights for the author. Copyright transfer forms and transactions are generally recorded in files in publishers' offices, and the copyright statements in books and journals do not describe details of the transfer nor who has retained what rights. Also, publishers come and go; rights are sold. When permission may need to be sought, it is increasingly difficult to know where ownership lies. All the scenarios explicitly mention or assume the existence of a database detailing ownership of published academic works. Such a resource is of surpassing importance and the national efforts to create it are worthy of continuing attention in further work that may be undertaken on the IP project.[34]

---

[34] According to Marybeth Peters, Acting General Counsel, Copyright Office of the U.S., in a fax dated March 31, 1994: "The ARPA, LC, and CNRI are collaborating on the development of an experimental Electronic Copyright Management System (ECMS). Using high-performance computing systems and networks, ECMS will include: automated copyright registration and recordation of transfers of copyright ownership . . . The proposed testbed . . . should be operational by the end of 1995."

Scenario 1: Enhancing Current Practices

Brief Description

Currently, the overwhelming majority of university copyright policies assume that faculty members own the works they produce and can transfer this ownership as they choose or are required by their publisher. In the first scenario, while the assumption of initial author ownership remains unchanged, all university employees (faculty, researchers, students, and staff) are educated and informed about the meaning of copyright law and the consequences of copyright assignment or transfer. The scenario encourages authors to retain rights for on-campus and inter-institutional deployment, for course packs, for campus delivery of articles, interlibrary borrowing and lending, and any AAU or other consortial sharing arrangements which exist or may be put into place.

This scenario envisions individual university members of AAU mounting strong programs for campus information, discussion, involvement and support (through model language, contracts, and licenses; copyright advice; information about academic publishing and publishers). To begin the enhancement process, representatives of university presses and society publishers whose officers are employed in AAU universities would enter into discussions with faculty to consider language acceptable for copyright transfers, contracts, or licenses; the negotiated outcomes would attempt to balance the needs of authors, universities (readers, researchers, students, libraries) and publishers. University faculty and administrators would also consider what incentives could be offered to researchers and scholars to publish in lower-priced journals and to develop alternative publishing vehicles such as public domain electronic journals.

Advantages

This scenario capitalizes on authors' keenness to have their work disseminated as widely as possible but asks for more thoughtful stewardship of their intellectual property. The aim is to change the awareness and practices of university authors in a voluntary and positive manner. (Concern about academic freedom should be addressed and alleviated.) The choices authors make are voluntary and consensual, in keeping with the academic climate. While publishers may initially feel uneasy, their needs are taken into account in the creation of contract and transfer documents that are agreed upon with the not-for-profit publishing community, a community with objectives essentially parallel to those of universities. It is the intent of this option to maintain, not to demoralize, the existing publisher community, many of whom serve universities very well at affordable prices based on cost-recovery and educational missions.

Costs of implementation are modest, since the plan does not require a new publishing system or re-design of the current one, beyond the profound alterations that changes in technology and society already prompt. A Visiting Program Officer for a year or two, working for AAU and ARL, could make a great deal of progress on educational brochures and packages, as well as on sample agreements.

Even as the scenario can positively influence current print on paper practices, it could also inform and ready university authors for the rapidly emerging electronic publishing world. It is compatible with placing information online in new university-based database or publishing systems which are being discussed in other groups, including other AAU task forces.

Faculty will likely find this scenario congenial and comparatively easy to adopt.

Disadvantages

Some will see this scenario as too modest. A powerful argument can be made that electronic distribution will transform our roles and institutions, and retaining publishing systems we are accustomed to will discourage us from taking advantage of new publishing methods. However, since it is currently very hard to characterize those methods, this argument seems idealistic rather than practical.

Because this scenario seeks enlightened behavior through volunteerism, it is not clear that enough individuals would change the way they currently assign copyright. For that matter, it is not clear how many are enough. This scenario, in its current mode, is "incentive-weak." Moreover, it is not specifically and exclusively focused on electronic publishing, which some might find a weakness; however, it neutrally addresses all technologies.

Implementation

Implementation would take time. That is, developing general documentation and information would likely take AAU and ARL staff about a year. As an outcome of the IP Task Force work, its report would be copied and promulgated, and presidents would have to ensure that it finds its way onto every faculty senate and dean's council meeting, and then to the departmental level.

Initially, campus working groups would be set up in at least a few institutions that have indicated their readiness to proceed. On each campus, a specific department and individual(s) would be asked to develop practices, resources, and language that suit the specific institutional needs; to assist authors in making transfers and choices; to inform them of their rights in re-use, classroom use, and reserves; and generally to be a dedicated resource in the copyright area. A recommended product on individual campuses will be a database or registry of university-originated copyrighted works and the permissions and restrictions associated with these works, to feed into an AAU gopher registry for use by all institutions. Such a registry would make it easier for faculty, users, and libraries to determine who has permission to copy what. At present this can be an onerous chore. Copyright transfer language is very diverse, and the publisher or CCC is not necessarily the proper source for permission. The complexity of ownership and permissions is increasing rather than diminishing.

Documents and discussions from individual campuses will be widely shared by AAU/ARL institutions. The logical place for an individual campus copyright clearance and advice center is in the office of the Vice-President for Research, or Academic VP, with close liaison with the university librarian's office and campus legal counsel's office. The University Press and University Library are also logical choices.

Additional Comments

In working with the entire campus to heighten awareness of the meaning and purpose of copyright and its effective deployment for the institutional good, we remain open and flexible to the changes that will occur via electronic publishing. An informed author base is the first critical step in making transitions into the future, when entirely different means of handling copyrights may, indeed, prove desirable. (drafted by Ann Okerson)

Scenario 2: Faculty Ownership of Copyrights

Brief Description

In the faculty ownership scenario, faculty authors choose to retain copyright in all works they produce. At the present time, by contrast, most publishers require authors to assign the copyright to them, and thus the author loses control of the work. Under Scenario 2, the faculty author determines what rights to transfer to publishers and whether to grant blanket permission for educational uses, inclusion in course packs, and the like. That is, this scenario is an extension or result of the education phase in Scenario 1. While transferring the necessary rights, authors would likely retain copyright. (Universities would probably encourage faculty authors to place their works for publication with quality publishers whose prices per page or other unit of cost are not the highest in their disciplines.)

Under this scenario, faculty authors would allow publication or other forms of access to each of their works on a case-by-case basis or by a statement of general principle. At a minimum, authors would continue to grant to publishers the right to reproduce and distribute the work in a specific publication. Authors would be responsible, either directly or through a central agency they or the university might create, for registering the copyright and granting permission to use their work.

Advantages

Faculty ownership of copyright assures authors the possibility of income in the event their works are reprinted or made available in other forms. Authors also retain the right to update, revise, and republish their works. For authors and educational institutions, faculty ownership can allow authors to make their works more broadly available to colleagues and students than the current arrangement.

Another important advantage is that this scenario may be easy to "sell" to faculty, since it places all rights within their management and control. This scenario encourages publishers to work with faculty in new ways both to reproduce and distribute their works, while recognizing that it is not necessary to take the entire copyright in order to disseminate the work. Faculty ownership also deals most directly with the problem of journals pricing, since authors would be encouraged to publish with less expensively priced publishers. Further, the scenario specifically includes a recommendation that faculty authors grant blanket permission for the reproduction and distribution of their works by other faculty and universities for educational purposes.

Disadvantages

An important disadvantage of this scenario for authors is that it forces them to become responsible for the paperwork and expense of copyright registration or for making arrangements for the publisher to do this in their names. Unless blanket permission is granted for educational uses, faculty would have to respond to repeated requests for permission to use their works unless the university creates an office to handle permissions. These services are currently provided by publishers. Ownership and management of copyright could feel onerous to faculty over a productive career.

A disadvantage of this scenario for educational institutions is that every educational user seeking permission to use a work would have to contact the author personally unless the author's university creates a central permissions office. If the author chose to impose monetary or other demands greater than those existing under current practice, then educational institutions and researchers would experience a relative loss rather than a gain in the access to knowledge. (Some publishers believe they more generously grant cost-free reproduction of sections of works to which they hold copyright than do individual authors who are copyright holders.)

Another disadvantage of this scenario is that some publishers may refuse to publish the work of an author who does not transfer copyright. It is possible, however, that if all university authors took the same position, publishers interested in continuing to receive quality manuscripts would alter their policies to accommodate the requirements of these authors and their institutions.

Implementation

Universities would first have to educate faculty members about the benefits of adopting the faculty ownership scenario. Then it could be implemented voluntarily by authors, with the encouragement of their institution. On the other hand, universities could adopt the scenario and require that authors not transfer copyright to publishers (this probably then would be part of the employment contract). Universities might want to establish offices to handle copyright permissions, or the AAU/ARL might want to establish a collective to handle permissions. The cost to the university of doing so would be modest. It would have to create an office or designate an officer to handle permissions to reproduce faculty authors' works.

Additional Comments

For this scenario to achieve its objectives of increasing access to information at reduced costs, faculty authors and/or their universities would have to construct a central medium for registering works and granting permissions. Although each work might include a universally adopted statement allowing reproduction for educational purposes, situations will invariably arise where a permissions office is needed. (drafted by Charles Timberlake)

Scenario 3: Joint Faculty/University Ownership of Copyrights

Brief Description

The joint faculty/university ownership scenario envisions shared ownership between the faculty member and his or her university. The scenario relates in general to non-royalty producing works or works that are unlikely to produce royalties. The university and the author determine what rights to transfer to the publisher, whether to license certain uses of the work, etc. Thus, control is not automatically transferred to publishers. In order to implement this scenario, new employment contracts would be required to specify joint faculty/university ownership of these works.

The university would waive royalties on property it jointly owns, but for works that generate substantial revenues, the university may require reimbursement for extraordinary expenses incurred by the university as a result of the faculty member's production of the work (i.e., extraordinary computing time, software development, audiovisual production costs, etc.). As a co-owner, the university has absorbed costs of generating the scholarship or research. The university has an interest in determining where articles are submitted for publication in order to achieve the goals of cost reduction to the university, increased availability in alternate formats, and the like.

Advantages

Joint faculty/university ownership most directly addresses the problem of the cost of materials which a university library must acquire. Since faculty authors generate and publish research results, the author should be able to retain rights to reuse works and, with the university, to grant these rights to other colleagues and universities. The university must also provide considerable support to the faculty member in exchange for its ownership rights. In exchange for these services, the university (as a co-owner) gains a role in determining where articles are placed, based not on censorship but on the goal of utilizing publishers that do not over-price. This scenario also can be particularly effective in the electronic environment

Disadvantages

It will likely be difficult to effect any change from present policy and practices. Employment contracts would have to be changed to delineate shared ownership and to define rights and will have to specify whether ownership is 50-50 or on some other basis. Faculty may initially fear a loss of rights, but a strong education program should allay concerns by reassuring them that in reality they can retain greater rights and control than they have under the present system. Another disadvantage, possibly a substantial one, is that the cost-recovery (as well as for-profit) publishers may be disinclined to take on the financial risk of value-adding to a faculty-produced work because they would be competing with authors and universities. The electronic environment may bring about these changes, in any event, when universities themselves can create and manage databases.

Although not exorbitant, universities will incur some costs to implement this scenario. Likely costs include staff time for modification of employment contracts and the funding of an office and/or officer(s) to advise authors and handle copyright permissions (see Structure section). Full implementation likely will require a 2-3 year period based on the number of steps required (see Implementation section).

Implementation

Implementation will probably require a multistage process. For example, faculty education must occur in several stages: (1) the general problem, (2) the effect of choice of publisher on university expenditures, (3) how joint faculty/university ownership will help correct the problem, (4) implementation through a pilot project that involves faculty volunteers who might submit works to an electronic site and/or create a database of their works that the university manages, and, finally, (5) full implementation. Working groups will need to be established with publishers in order to sort out what rights are necessary to continue their interest.

Legal counsel must be involved to deal with employment contract issues and to redraft the institution's copyright policy. Two new services need to be provided: (1) an office that provides advice to faculty members on publishing, contract negotiations with publishers, etc., and (2) an office to handle requests from other universities and outside entities for permission to use faculty/university copyrighted materials. This is a possible role for AAU or ARL.

Additional Comments

Creative publishers will find ways to work within this structure. Association and university press publishers might be receptive to such arrangements, especially if the university and faculty members designate one source for dealing with publisher contracts. This will reduce the difficulty publishers currently have in negotiating with individual authors. (drafted by Laura Gasaway)

Scenario 4: Joint Faculty/Consortium Ownership of Copyrights

Brief Description

In this scenario, copyright is jointly held by the author(s) of the work and a consortium of universities. This only applies to work for which the authors do not receive and do not have a reasonable prospect of receiving royalties and which does not fit under the category of work-for-hire. Any of the copyright holders has the right to copy or distribute the work or otherwise make it available, with the following significant exception:

The author or authors retain the right to assign an exclusive distribution license to whomever they choose for a period not to exceed five years (the exact time limit may depend on the academic discipline). This right would have to be exercised within a fixed time period after completion of the work—perhaps three years.

Any other transfer of the rights included in copyright requires agreement by all holders of the copyright. In exchange for its share of the copyright, the consortium guarantees a permanent electronic repository of an authentic version of the work. Furthermore, after the expiration of any exclusive distribution rights, the consortium guarantees that the work will always be freely accessible to the authors, to all faculty at those institutions participating in the consortium, and to anyone to whom the authors give access to the work. The consortium or its member libraries will catalogue and cross-reference the work and provide other value-adding services as appropriate.

Advantages

While asking faculty to relinquish the right to transfer copyright, this scenario maintains the faculty's right to give exclusive distribution rights for a period of time and thus does not restrict a faculty member's ability to publish wherever he or she desires. It gives the faculty member value-adding services in exchange for a share of the copyright. It enables publishers to obtain exclusive distribution rights which, in the present climate, are still needed to maintain financial viability for society and university presses.

This scenario recognizes that current distribution is an important value-adding feature but that service and access is in the long-term the institutions' and the library profession's business and responsibility. Implementation of this scenario could shrink the traditional journals business, particularly for the most expensive (i.e., very large or very specialized) titles through a natural marketplace action by the creators and owners of the intellectual content.

Disadvantages

Libraries would still be in the position of having to buy articles from publishers who have obtained exclusive publication rights. This scenario does not solve the problem of high prices in some commercial outlets, since exclusive distribution rights are still assignable as the faculty member chooses. This scenario also assumes a digital world, but a lot of hard copy is still produced. As long as hard copy and "traditional" print publications continue to coexist with electronic media, print publishing needs to be addressed.

This scenario has the highest startup costs of all.

Implementation

The intention is for this information dissemination system to grow organically under the oversight of an umbrella organization that would work out the legal framework and the general guidelines for a variety of small consortia (like the CIC), guaranteeing compatibility and the free sharing of information among the associated consortia and with professional societies and other organizations that are brought on board.

The initial components of the information dissemination system will be small consortia that already have electronic networks. Member universities will encourage faculty to use the consortial depository for their electronic preprints and reprints (rather than departmental or individual electronic sites). This will be accompanied by a crack-down on electronic sites that do not make explicit provision for withdrawing articles on which copyright has been signed away. The deposition of any article in the consortial depository will require the author(s) to share copyright with the consortium under the agreement stated above. If the author elects to exercise the right to assign exclusive distribution rights outside the consortium, access to the consortium's copy of the article will be blocked to everyone (including the author) until the expiration of those distribution rights.

Under this umbrella, university presses and professional societies will be publishing exclusively electronic journals of high standard that offer fast turn-around and wide dissemination (all or most universities and colleges within the umbrella will be subscribers). These journals will permit their articles to remain accessible on the consortial depository. Faculty at a participating university will have easy access to these journals through their depository (e.g., at the time of deposition, list in order of preference the journals in which you are willing to have your article published).

Faculty incentives for publishing in these electronic outlets need to be put in place. A minimum incentive is the guarantee that publication in any of these fora will be viewed favorably for purposes of promotion and tenure. Faculty incentives also need to be established to reward those who invest time in development and maintenance. Disincentives for failure to deposit an article may be introduced after the system is well established. New faculty may be contractually required to place all preprints in the depository. All faculty at institutions under the umbrella must have the ability to search the depositories and access the associated electronic journals from their offices.

Additional Comments

We will not solve the current serials pricing crisis through copyright law even if we do alleviate some problems through better copyright education and support. The solution will come when we have an information network maintained by the academic community that encourages the widest possible dissemination of scholarly work at the lowest possible cost to the universities. To create such a network, the academic community must move aggressively into electronic publishing. The community must experiment with new forms of journals and new models for cost recovery. The most natural vehicles for this move are consortia such as the CIC (the Big Ten + Chicago) which already have an electronic infrastructure and are well positioned to work cooperatively with university presses and professional societies in establishing and encouraging electronic journals.

Would faculty voluntarily share copyrights with their universities and make their work available in an affordable, widely accessible database? Is it possible to convince university and society publishers to be part of such an information dissemination system (IDS)? The outlook is very good. For publishers, the IDS would have to provide a guaranteed income stream. Faculty seek three results from publication: the opportunity to share the fruits of their academic labor;

prestige and reputation; and the accumulation of the kind of capital that buys rewards (promotion, tenure, grants) in an academic setting. The IDS can be set up to meet these needs efficiently and it can provide incentives for faculty to share ownership in a manner useful to the mission of universities.

This scenario would establish the principle that collectively the AAU/ARL universities have a long term interest in the ownership of scholarly work produced by their faculties and would encourage them to publish electronically via a consortium of like-minded institutions. (drafted by David Bressaud)

6 - Corollary Issues for Further Deliberation

Over the course of the Task Force's deliberations, five corollary issues emerged. The Task Force came to no settled conclusions on these matters, which are reported here as areas of substantive uncertainty and policy tension that must be considered in the institutional policy building the Task Force recommends. The following paragraphs describe each of these issues.

A. Need to commit resources to university copyright management.

While the Task Force does not recognize any of the scenarios described in the previous section of this report as clearly preferable to the others, it does believe that any greater involvement by the university in the management of copyrights will likely require:

- Assigning some university office to assist faculty and other university authors with the assignment of copyrights or with publishing licenses, granting permissions, and related matters;

- Active copyright education programs on campus;

- Strengthening affiliations with the non-profit professional and learned societies, whose officers and editors are generally members of the academic community;

- Maintaining or restoring, where necessary, infrastructure support for faculty editors working for non-profit publishers;

- Integrating university presses more powerfully into overall university information management objectives, and encouraging presses to take an assertive role in publishing scientific, technical, and medical journals, especially in electronic forms. This will require treating the presses as programmatic partners with libraries and academic computing centers. It will also probably require reversing the trend toward treating university presses as stand-alone cost-recovery centers;

- The rather harder to quantify questions of faculty recognition, rewards, and tenure lurk behind the pressure to publish. These need to be explicitly addressed on campus, in relation to discussion about faculty publishing needs and patterns. Changes in publication patterns could affect the current rewards system.

B. Possible undesirable dislocations in existing markets.

Task Force members speaking for learned societies and university presses were sympathetic to concerns about high journal costs and felt that non-profit publishers could normally deliver journals at much lower costs. They nonetheless expressed grave uneasiness about possible negative results of universities becoming active managers of copyrights.

Faculty or university retention of copyrights was a troublesome concept. The publishers on the Task Force affirmed that the existing practice of transferring copyrights is essential to giving publishers the market-place control needed to make rational editorial and investment decisions as well as to recover costs. Nonetheless, they were agreeable to the prospect of negotiating short-term exclusive or broad (though not exclusive) distribution rights.

These publishers are more sympathetic to academic authors retaining some limited rights to the subsequent use of their own work (in classroom instruction, for instance). In today's academic publishing market, where nearly all revenue comes from book sales and journal subscriptions, some publishers are willing to consider transfers of copyrights that reserve specified secondary uses to authors. But as publishers' income streams shift away from book sales and subscriptions and toward various access fees (for the use of individual articles, book chapters, parts of data sets, or segments of electronic text), rights retained by the author may increasingly represent lost sources of revenue for the publisher. It is feared that such revenue losses could drive non-profit publishers operating on slim markets out of business long before it would have any negative effect on the largest commercial publishers.

Others on the Task Force believe scholarly communication is changing so fundamentally that no publishers except the most adaptable, agile, and creative are likely to remain in business.

One Task Force member feared there was little reason to believe universities would manage their copyrights disinterestedly. The competitive nature of higher education and the need to exploit every possible revenue source might prompt universities to manage copyrights with purely commercial motives indistinguishable from those of for-profit publishers.

C. Possible rationalization of existing markets.

While there may be market-place disruptions to fear, there exists real hope for beneficial change. Competitive conditions in the existing market place, especially for research journals, decidedly favor copyright holders. Responding to high costs by lowering demand--i.e., by cancelling subscriptions--works only for titles that are not central to a discipline. Such cancellations are usually not a realistic option for high-prestige titles and other titles vital to a given field of study. The strong position which publishers of such titles hold by virtue of the customary transfer of copyrights to them is very powerful and is one factor (though only one) in the unacceptable structure of information costs research universities face.

One might hope to weaken this monopoly position by retaining certain key copying rights for universities when copyrights are transferred, or when--perhaps better--authors retain their copyrights and grant only certain rights to publishers. One might also, over time, work to increase the prestige of university and other non-profit publishers, so that less of the economic value of university-created copyrights (especially of journal articles) would flow to the profits of the higher priced publishers. Another way to alter the monopoly position of very expensive, high prestige publishers is by universities moving aggressively into electronic publishing. Where other considerations are neutral, universities might positively manage copyrights so as to favor non-profit publishing.

D. Changing environment for the creation of added value by publishers.

In traditional print-on-paper publication, publishers create substantial added value by virtue of their editorial (i.e., their gatekeeping) functions and by a host of design, production, marketing, copyright management, and other activities. Closely related services--such as indexing and abstracting, document delivery, and the development of information management software--also represent major enterprises. The forms in which these activities will be carried into the electronic environment and how the costs for these activities will change in that environment are matters of considerable debate.

Publishers serving on the Task Force felt the new environment might save only about 20% of their existing costs. By contrast, one faculty member of the Task Force urged that current publishing modes will in the future have little relevance to the conduct of highly specialized scholarly communication. Where scholars are writing primarily for other scholars, the process will arguably be managed directly by the faculty involved and conducted outside the "money economy" of conventional publishing.

E. Academic freedom.

The Task Force felt there were possible implications for academic freedom in some of the issues it discussed.

The pertinent part of the AAUP's definition of academic freedom is: "The teacher is entitled to full freedom in research and in the publication of the results, subject to the adequate performance of his [sic] other academic duties; but research for pecuniary return should be based upon an understanding with the authorities of the institution. . . ." (Academic Freedom and Tenure: 1940 Statement of Principles and Interpretive Comments.)

The Task Force found no inherent incompatibility between "full freedom . . . in the publication of results" and greater university involvement in the management of copyrights. In disposing of their copyrights, faculty are keenly aware of the relative prestige of various publishers and of the bearing of that prestige on promotion, tenure, and merit salary decisions, on research funding, and on peer recognition and professional mobility. These are vitally important matters that require careful consideration in the further exploration of the four scenarios advanced for managing copyrights. But they relate primarily to faculty career development and do not go to the essence of academic freedom, which has to do with advancing truth through the competition of ideas in the intellectual market place. Where research findings are so specialized they are likely to be published and read in only one or two places, institutional restrictions on such publication would clearly constitute a violation of academic freedom. Otherwise, and certainly in the vast majority of cases, there are enough appropriate publishing outlets that institutional objection to any of them is unlikely to pose a serious threat to academic freedom. Indeed, one normally would expect faculty and universities to have the same motivation in favor of prestigious publication.

One can, however, imagine circumstances in which an institution might use its copyright ownership position (whether as sole or joint owner) to stifle the publication of a work of which it disapproved or whose publication it would find embarrassing, or to harass a faculty person out of favor with the administration. The appropriate response to such abuses of academic freedom would be to identify and proscribe them. That is how the AAUP customarily deals with other threats to academic freedom.

7 - Will Copyright Endure?

It is not possible to conclude a discussion that includes policy recommendations for the present management of intellectual property without noting that this is a particularly difficult time in which to prophesy on the future of subjects such as copyright -- though the risk seems rarely to work as a deterrent. The approach in this report has been to assume that legal constructs and economic practices familiar in the world of mainly printed information will persist and can be modified to account for information that comes in technologically different forms.

Yet there is a strong current of contemporary thought[35] that holds that society is about to reach the point in technological change where current ways of doing business, dependent initially on old technologies and then gradually evolving in response to such technological change as we are beginning to see, are about to collapse completely. Information wants to be free, these voices cry, and they point to the contemporary free-for-all of the Internet as the shape of things to come.

This is a line of argument that must be kept in mind, for it certainly cannot be totally refuted on present evidence. If universities cling to current institutional forms, those who are part of them may wake one day to find themselves keepers of quiet gardens no longer much frequented by a bustling world that has taken its information business elsewhere. It is a risk that probably faces traditional publishers most urgently, but to the extent that universities have evolved their information policies in tacit and explicit collaboration with the publishing industry, they run the risks along with it.

What is in fact likely to happen is neither the libertarian fantasy nor the completely commercial conquest of cyberspace, but something halfway between. Old-fashioned forms of information will continue to be produced and used and remarkably new and novel ones will emerge. The new is unlikely to eradicate the old, but it will surely supplement it and threaten to supplant it. It is impossible to predict what percentage of our institutions' information needs and use will be met by one or another medium five or fifty years hence.

For these reasons, two things are of surpassing importance. First and simply, that universities and their members know what their intellectual property policies are -- that universities have policies and enunciate them clearly, so that when change occurs it can happen in an orderly fashion. Second, that university presidents do not look upon the issue as one to be resolved now and so left settled for the future. The 1976 Copyright Act, as any copyright law, was an attempt to make such a settlement, and there are already voices suggesting that perhaps the monumental task of revising it again cannot be put off forever, even as the most prudent voices argue for making do within the framework it creates. But universities are not (thank goodness) entirely like the United States Congress. They need not "pass a law" and this Task Force does not recommend any law-making action. Rather, universities can create a process. They can make concern for intellectual property policies and their effects on institutional goals a continuing part of institutional consciousness. If together members of the university community do that, then universities can look upon the emerging frontier as one where they can play a leading part.

---

[35] Nothing if not provocative, John Perry Barlow, "The Economy of Ideas; A Framework for Rethinking Patents and Copyrights in the Digital Age (Everything you Know About Intellectual Property is Wrong)," *Wired*, March 1994: 84+, begins with Thomas Jefferson and moves to electrons dancing on a screen. Barlow's argument is that so fundamental a technological change will completely overturn our notions of property, value, and ownership.

Recommendations

The Task Force recommends that the Association of American Universities, working in partnership with the Association of Research Libraries, continue the process begun by this Project.

In the first phase of the process represented by this report, the IP Task Force has identified and highlighted the copyright issues most critical for universities' success in the digital information environment. The next crucial phase is to build campus consensus and bring other organizations, particularly the Association of American University Presses (other organizations such as the American Council of Learned Societies should be considered) into the process. Coordination could continue under the AAU or ARL rubric using current ARL staffing. If they are available, the current Intellectual Property Task Force members could continue working in the recommended groups. Funding to continue the next stage must be secured so that groups can easily meet together and communications can be facilitated.

The issues to be addressed divide roughly into those that affect universities' status as users of copyright information and as producers. Some of these issues need to be addressed on a campus-by-campus basis, while others can benefit from a continuing national AAU/ARL dialogue. Finally, so that the achievements of individual campuses can be recognized and imitated, the national initiative should monitor and coordinate activity at the campus level and assist in disseminating information about the results. Action items are identified for both levels of activity, local and national.

I. Local Actions: Form campus committees to create copyright policies for individual universities in two areas: Copying and Copyright Ownership.

The purpose of action at the level of the individual university is to inform faculty members about copyright and engage them in defining coherent and comprehensive copyright policies. Several university presidents will be asked to offer their institutions to serve as the core of a consortial group to work closely with the AAU/ARL IP project. Each volunteer university (three to six are suggested) will appoint broadly-based committees to consider issues affecting copyright on campus. The discussions will be shared with -- and informed by -- the Task Force's work. The volunteer institutions will be charged to create comprehensive model policies and documents for their own universities in the areas of both:

(A) Universities as copyright users (i.e., copying):

Each volunteer university should work towards creation of a coherent campus copying policy addressing print, visual, aural, broadcast and computer media. This policy should be designed to exploit the full range of rights secured for higher educational activities by the 1976 Copyright Act. Fair use must be particularly emphasized and utilized.

Normally, the model policies should provide for a designated officer at each university to act as copyright specialist, ombudsperson, troubleshooter, and educator. This individual could be a university press officer, librarian, faculty member or the university's legal counsel. Logical sites for this office are: vice president for research, institutional counsel, office of the library director, or the university press. Additionally, this individual would be responsible for coordinating the signing of licenses on campus, with the objective of developing standard licenses with no unduly restrictive clauses. A copy of each transfer and licenses signed by campus individuals or units would be housed centrally for consultation as necessary.

(B) Universities as creators (i.e., ownership, copyright transfer, and licensing)

Each volunteer university should also develop detailed, coherent, and readily implemented policies on the ownership and management of intellectual property governed by copyright law. Each model policy will articulate the basis for the ownership and management of copyrighted works created at the university. In the course of policy development, the scenarios presented in the attached report need to be considered, as do questions of incentives, prestige and academic freedom. Particularly important are discussion about the specific rights that should be transferred or licensed to publishers and those that should remain with the creator or institution.

Outcome: Model policies to share throughout AAU.
Timing: Completed for the AAU of Fall 1995.

II. National Actions: Form a coordinating group that prepares in-depth reports in two vital areas: Fair Use and Competitive Academic Publishing, particularly electronic dissemination.

This group will coordinate, monitor, and disseminate results of the local actions to all AAU/ARL institutions. Additionally, members of the group will be asked to study and prepare reports and recommendations on two critical multi-institutional matters:

(A) Academic/research community consensus on fair use rights in an electronic environment

This effort will examine the constitutional basis and purpose of fair use rights and how they may be exercised in an electronic environment. Fair use should be independently studied, especially as it relates to the transition to an electronic environment for scholarly communication and rights transfer/assignment to publishers. Discussions on these issues should take place first with university presses within AAU/ARL institutions before radiating out to other publishers. Unlike some publishers who might prefer to eliminate fair use in the electronic environment, university presses (and learned society publishers whose editors are often faculty of research universities) have generally supported the continued application of fair use guidelines to electronic documents. Nevertheless, significant questions remain about precisely what constitutes fair use and how different applications of fair use guidelines will affect students, faculty, libraries, and presses.

Outcome: White paper examining the issues associated with fair use in the electronic environment, what it means and how it can be employed to advance higher education, science, and the arts as public goods.

(B) Feasibility report on strengthening and creating competitive, university or society-based publishing outlets and positioning universities strategically for electronic publishing

This effort will consider ways in which university presses could be strengthened and funded to take on a more visible, competitive role in the scholarly publishing community. The values and standards of university presses have long been supported the mission of research universities. With cooperation, proper planning, financial seed money, and support, presses should be able to play a vital new role in the area that hits library budgets the hardest: science journals publishing. Through the technological structure already in place, AAU institutions could also be particularly effective in Internet-based publishing. The group will explore the feasibility of university presses entering this arena.

The Task Force members believe that the proposed Scenario #4 as described on pages 28-29 of this report deserves particularly intensive study. The creation of a consortium to serve as an electronic article copyright depository, if begun with the necessary faculty and institutional commitment, could become the basis for an exciting, innovative model for electronic distribution.

Outcome: Specific recommendations or feasibility plans.
Timing: Both reports completed for the AAU meeting of Fall 1995.

III. Corollary Issue.

Though it makes no specific recommendations in this area, the Task Force wishes to make the following additional point:

> The long-term preservation and access to knowledge must be assured. The traditional library role is under some threat from lack of library ownership of electronic materials (many of which are licensed to libraries rather than sold to them) combined with lengthening periods of copyright. Who will assure access when publications cease to be viable in the market? Addressing the full range of intellectual property management issues in academe will help assure the future availability of information.

AFTERWORD

It has been a great pleasure to participate in the efforts of the Intellectual Property Task Force that have led to the Report you have before you. An extraordinarily hard-working group of university faculty, librarians, publishers, and academic administrators, the members of the Task Force worked harmoniously, energetically, and with a great sense of common purpose. I have rarely been a member of a group which cared -- and knew -- more about the issues on which they were working. While Ann Okerson, Scott Bennett, Nancy Marshall, and Laura Gasaway assumed primary responsibility for drafts of sections of the Report, and while, Ann, Scott and I worked together to produce the final document, virtually every Task Force member contributed importantly to the final product. Still, I do want to acknowledge Ann Okerson's uniquely valuable contributions. Knowledgeable, hard-working, insightful, and inspirational, Ann deserves more credit than any other Task Force member for the document you now have before you.

Peter E. Nathan
March 31, 1994